DECEMBER 17, 1960

Chemical Week

A McGRAW-HILL PUBLICATION PRICE FIFTY CENTS

New Chemicals for Industry

CW Report .... p. 41

Which brand marks bonanza beef?

It's the "N" in the middle that marks the choice steer. And no rustler with his brand-changing running iron can alter its meaning: *Nitrogen*.

Newest way to increase beef production is to apply Shell Chemical nitrogen-rich fertilizers to grazing land. Forage growth spurts —often doubles—and that means more animals can fatten on an acre. Grass becomes more appetizing and nutritious. Result? Better steers, faster. Proved throughout the West, rangeland fertilization can earn the rancher as much as four extra dollars for every dollar invested!

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Lithium Fluoride
Metallic Fluoborates
Potassium Bifluoride
Potassium Chromium Fluoride
Potassium Fluoborate
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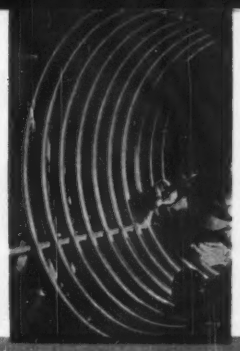

ON THE COVER: Welder at Saffran Engineering Co. (East St. Clair Shores, Mich.) is shown affixing titanium heating coils to spacer. Fabrication gains boost titanium equipment (p. 29).

Chemical Week

Vol. 87, No. 25 DECEMBER 17, 1960

December 24 issue will be last issue of year.

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There are four other oxazoline waxes also available. Let us discuss your specific problem and provide you with samples. Write on your letterhead to Market Development Department, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, New York.

PHYSICAL PROPERTIES	TS-254	TX-1	ES-254	TS-254A	TS-254AA	TS-970
Melting point °C	63	160	37	50	93	74
Volume Expansion on melting—%	7.7	—	8.9	9.2	9.2	9.1
Penetration, ms/100 gm. load (ASTM D5-25)	0.2	—	1.3	0.3	0.4	0.1
Acid No. (approx.)	7	12	9	2	1-2	6
Solubility, % by wt. in:						
Butanol	7	49	50	22	13	4
Toluene	16	52	49	16	7	16
Carbon Tetrachloride	16	47	49	gel	14	gel
Stoddard Solvent	12	52	49	17	4	5
Butyl Acetate	11	55	49	13	9	6
Methyl Isobutyl Ketone	10	ins.	49	10	8	5
Turpentine	21	10	24	21	10	10

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The Trouble with Research

OUR NEW CHEMICALS REPORT *(p. 41)* attests to the vigor of chemical research. This is not only laudable but also necessary, since the health of the industry depends on a constant flow of new products.

Will this vigor continue? Only if various obstacles are surmounted. First, of course, is the increasing cost of research—higher salaries, more complicated and costly equipment. Then there's the increasing competition for technical talent from the newer, and hence more glamorous, industries based on electronics and solid-state physics.

But the most serious hindrance is the continuing slide of profit margins—a slide that will continue through '61 at least. True, chemical industry profits are better than the all-industry average; but that's something to be proud of rather than apologetic about: the industry uses its profits and depreciation reserves to develop and commercialize new products. As a result chemical investors have fared poorly in income but very well in appreciation of their equity.

Today, however, it's becoming more difficult to finance the research and development of new products out of the profits on the bread-and-butter chemicals. Too many firms, some of them new to the chemical industry, have seized the opportunity of a quick killing in established products by buying a market research package and a plant design and construction package, getting into production, and grabbing a share of the market by cutting the price. They could do this at a profit because they had no research and development costs to regain.

There's no law against such opportunism, of course, nor should there be. Any legally sanctioned cartelistic collusion would not only be contrary to our present antitrust laws and alien to our philosophy, but would pollute the wellsprings of our economic strength. On the other hand, a host can't live long if he is being bloodlet by parasites—nor will the parasites long survive him.

Here is an area where one must tread cautiously. What is called for is industrial statesmanship that seeks the welfare of the whole industry as well as private gain.

A New Dimension

IF YOU TURN to page 23 in this issue, or to pages 38, 98 and 100 of your Dec. 10 issue you'll see a new feature designed to improve CHEMICAL WEEK's usefulness to you. We call it "Dimension" because it adds just that to our reporting of industry developments.

CHEMICAL WEEK is edited, of course, to be easily understood by management men throughout the chemical process industries. Those managing technical functions—research, engineering, design and construction, production—are likely to have chemical or engineering backgrounds; but those supervising sales, purchasing or general staff departments may or may not be technically trained. A technical "Dimension" is optional reading, will give many readers additional useful information related to the primary story.

If the major story describes a particular company's new development, the "Dimension" may provide background data on the company itself. Or the "Dimension" may tell something about the man or men responsible for the development.

In short, "Dimension" is a device to provide a bonus of information without interrupting or diverting the smooth flow of a story.

DOW | **SARAN LINED PIPE**

5 miles of pipe, 12 years of service

Saran Lined Pipe keeps process acids flowing!

When five miles of process piping must carry an unfailing flow of highly corrosive acids, thorium salt solutions and slurries . . . when frequent flow changes require quick, on-the-spot pipeline modifications . . . that's when the extreme corrosion resistance and easy workability of Saran Lined Pipe make this process pipeline a process lifeline.

Above is one section of the approximately five miles of Saran Lined Pipe which carries process chemicals in thorium recovery operations at the American Potash & Chemical Corporation's Lindsay Chemical Division plant, West Chicago, Illinois. In this process, Saran Lined Pipe is required to carry highly corrosive materials: sulphuric acid slurries for ore leaching; reacted thorium sulphate solutions and waste slurries; concentrated hydrochloric acid, hydrofluoric acid slurries. The pipe network has been in constant use since 1947, and *there's never been a major process shutdown because of pipeline failure!*

Equally as important to Lindsay as corrosion resistance are the workability and strength of Saran Lined Pipe. The nature of the process requires frequent flow changes, meaning frequent changes in piping. Necessary pipeline modifications are done quickly and easily by plant personnel, cutting process downtime to a matter of hours. And high physical strength of the pipe minimizes the need for extensive pipe supports!

Saran Lined Pipe, fittings, valves and pumps are available for systems operating from vacuum to 300 psi, from below zero to 200°F. They can be cut, fitted and modified easily in the field without special equipment. For more information, write Saran Lined Pipe Company, 2415 Burdette Ave., Ferndale, Michigan, Dept. 2283AM12-17

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TITANOX provides coatings and liners with a wide range of valuable effects . . . the opacity that masks dark substrates, the shining whiteness that makes a fine background for colors and easy brand identification. TITANOX-A-WD—the anatase titanium dioxide pigment noted for low water absorption, ease of fine dispersion and uniformity of all properties is the usual favorite. But there's a TITANOX pigment to suit every type of paper that needs whiteness, brightness and opacity.

And as it is with paper, so it is with a host of other products. Anything that needs white pigmentation can best be pigmented with TITANOX. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

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Magna Coatings in L.A.

To the Editor: Your Nov. 5 issue (*p. 30*) carried the information that our firm was located in Hawthorne, Calif. This error has caused us . . . confusion.

(Mrs.) Evaune O'Keefe
Corporation Secretary
Magna Coatings & Chemical Corp.
1785 North Eastern Ave.
Los Angeles

Cautions on AMA Figures

To the Editor: Your article, "Profiling Staff Patterns for Profit" (*Nov. 26*), was an informative and interesting presentation of the study of manpower utilization undertaken by the American Management Assn. in its Group Ten Research Project.

I have had an opportunity to review some of the results and am confident that the work will contribute greatly to management knowledge in this area, especially as the sample is expanded and the analysis is extended, as I believe plans contemplate. Meanwhile, in my opinion, some degree of caution should be exercised in interpreting results.

First, as indicated in your article, the sample is more representative of large companies than small (and perhaps is also weighed more heavily by the more profitable firms); further considering the number of companies included (88 in total), groupings even by industry may be lacking in homogeneity and therefore may yield misleading results.

Second, in any sample, departures of one company from average performance are to be expected; however, statistical techniques are available for measuring the significance of any given departure; then, attitudes of concern or complacency may be governed accordingly.

Third, as indicated in your final paragraph, the relationship between profitability and administrative staffing may be a positive one (that is, magnitudes may vary in the same direction), rather than the negative one many persons assume; or the relationship may even be of negligible degree. For example, indications are that relative research expenditures are of major importance in determining profit rates, especially in the chemical process industries. Until more light is shed on this vital question, action to be taken on results shown cannot be intelligently planned.

Finally, human aspects affecting the productivity of the work force must not be overlooked, as may happen with a mere head count. Obviously, individuals vary widely in efficiency, depending upon their abilities and upon the working conditions met.

It is believed participants in the project are aware of these limitations, but your readers may not be so well informed. Despite these warnings, I believe much can be learned from this approach to an important management problem, and I think AMA should be congratulated on its pioneering effort.

Ralph E. Burgess
Ralph E. Burgess & Associates
Wilton, Conn.

Reader Burgess recently resigned as chief economist for American Cyanamid Co. to return to management consulting.—Ed.

Too Much, Too Small

To the Editor: In your article "For Outdoor Vinyls" (*Dec. 10, p. 46*) you say Union Carbide's Flexol at 40¢/lb. is "a hefty 12-13¢" above the cost of epoxidized soybean oil. Is this correct?

Francis Coates
Consultant
Detroit

No. Around 8-9¢/lb. would be closer. The higher figure should have referred to the epoxidized tallates. Also, the article mentioned a 35-million-lbs./year vinyl plasticizer business. In the story context this refers, of course, only to epoxy-type vinyl plasticizers.—Ed.

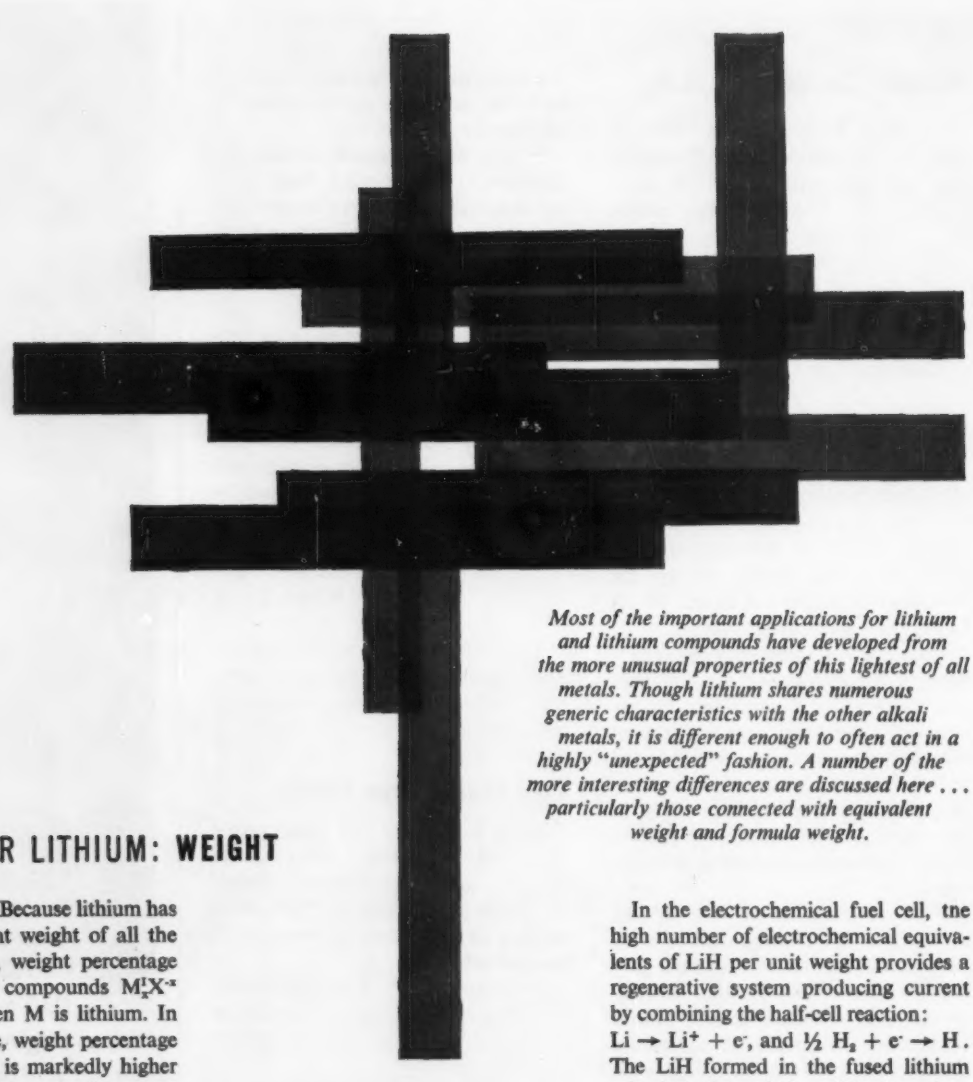
MEETINGS

American Assn. for the Advancement of Science, annual meeting, Philadelphia, Dec. 26-31.

American Chemical Society, 27th annual chemical engineering symposium of the division of industrial and engineering chemistry, Washington University, St. Louis, Mo., Dec. 29-30.

Instrument Society of America, winter instrument-automation conference and exhibit, Sheraton Jefferson Hotel and Kiel Auditorium, St. Louis, Jan. 17-19.

Parenteral Drug Assn., Inc., Statler Hilton Hotel, New York City, Feb. 3.



Most of the important applications for lithium and lithium compounds have developed from the more unusual properties of this lightest of all metals. Though lithium shares numerous generic characteristics with the other alkali metals, it is different enough to often act in a highly "unexpected" fashion. A number of the more interesting differences are discussed here . . . particularly those connected with equivalent weight and formula weight.

THE CASE FOR LITHIUM: **WEIGHT**

EQUIVALENT WEIGHT Because lithium has the lowest equivalent weight of all the alkali metals (6.94), weight percentage of the anion X^{-x} in compounds $M^{I}_{x}X^{-x}$ will be greatest when M is lithium. In $MClO_4$, for example, weight percentage of available oxygen is markedly higher in *lithium* perchlorate . . . to the extent that on a volume basis, there is 29% more oxygen in lithium perchlorate at room temperature than in liquid oxygen at its boiling point.

Similarly, lithium hydride provides the highest content of available hydrogen (chemical reaction equivalents or gas) . . . lithium hypochlorite the highest content of active chlorine . . . and lithium nitrite the highest nitrogen content per unit weight of reaction mixture: $(MNO_2 + NH_4Cl \rightarrow 2H_2O + N_2 + MCl)$.

WEIGHT PERCENTAGE OF AVAILABLE OXYGEN

M	$MClO_4$	MNO_2
Li	60.1	58.0
Na	52.0	47.1
K	46.2	39.6
Rb	34.6	27.3
Cs	27.5	20.5

The relatively large number of moles of material per unit weight makes lithium salts ideal fluxes or liquid formers, and freezing point depressants. This can prove of considerable consequence in reactions facilitated by a liquid phase through which reactants can readily diffuse. Relatively small quantities of lithium salts added to high temperature electrochemical processes can depress freezing points, increase fluidity, decrease viscosity and, at the same time, increase electrical conductivity.

FORMULA WEIGHT Lithium hydride's low formula weight makes it ideal for two interesting applications . . . a heat sink and an electrochemical fuel cell. In the heat sink, the high heat of fusion of LiH per unit weight provides a thermal energy source in the conversion of thermal to electrical or mechanical energy.

In the electrochemical fuel cell, tne high number of electrochemical equivalents of LiH per unit weight provides a regenerative system producing current by combining the half-cell reaction: $Li \rightarrow Li^+ + e^-$, and $\frac{1}{2} H_2 + e^- \rightarrow H^-$. The LiH formed in the fused lithium salt electrolyte of the cell is then thermally decomposed by a nuclear reactor to regenerate the reactants.

MORE TO COME The tale of lithium is neither quickly nor easily told. The material presented here constitutes the briefest of introductions. But if it has whet your appetite we can happily provide you with a great deal more of the same . . . long on facts and ideas, short on flim-flam, and complete with derivations and references. Just write for a copy of "Lithium vs. The Other Alkali Metals". Foote Mineral Company, 420 18 West Chelten Building, Phila. 44, Pa.

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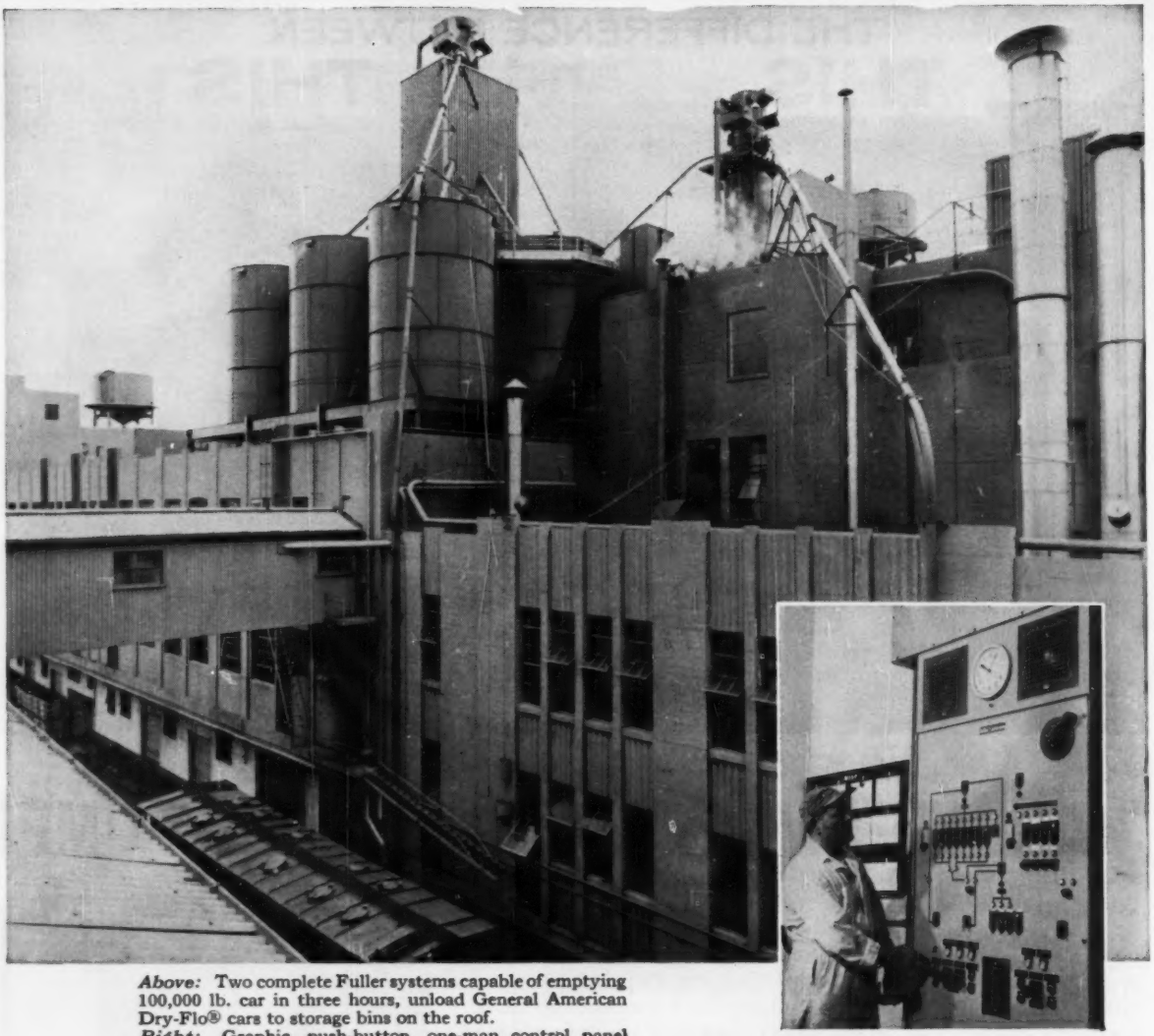

Above: Two complete Fuller systems capable of emptying 100,000 lb. car in three hours, unload General American Dry-Flo® cars to storage bins on the roof.
Right: Graphic, push-button, one-man control panel handles unloading, conveying and reclaiming.

NO PLACE TO GROW BUT UP

. . . so Burgermeister put 12 new storage bins on the Brewhouse roof

Putting a head on beer is one thing, but putting a head on the Brewhouse roof might seem an insurmountable obstacle. This growing San Francisco brewery was up against it for storage space. With no further room for lateral expansion, the only place to grow was up—but how? Could additional bins be loaded at such a height?

Fuller engineers were able to provide the answer. Airveyor® Pneumatic Conveying Systems don't balk at height. So twelve additional bins were mounted on top of existing equipment, and two separate Airveyor systems were installed. They even incorporate components from an existing Airveyor system which had been installed in 1947.

Now, with ample storage space, grits are unloaded from covered hopper cars to bins in just over three hours per 100,000-lb. car. The same quantity of malt travels the route in a little over two hours. And reclaiming and blending are handled at an equally high rate—all controlled by one man at a Fuller graphic control panel. Burgermeister has greater production with greater economy — as breweries must do to keep ahead today.

The success of Fuller in handling problems like those at Burgermeister is confirmed by repeat orders from customers everywhere. Breweries nation-wide look to Fuller to study their needs for expansion, higher production and for new brewery installations. Why not find out for yourself why they do it—and what Fuller can do for you? 2625 A-29 2

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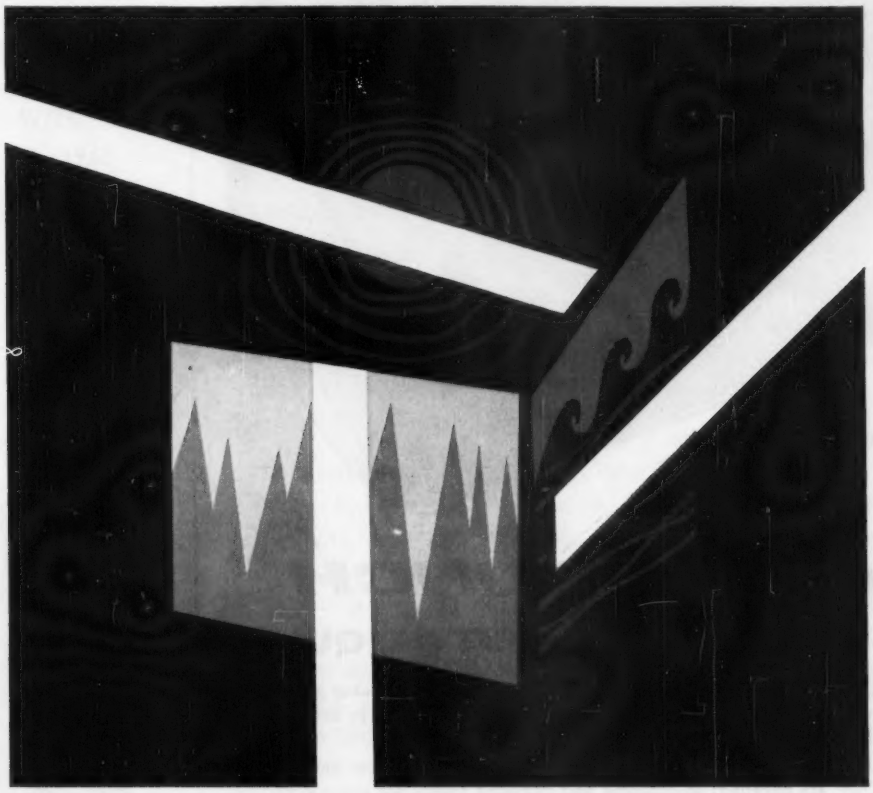

In Heat, Cold and Moisture Silicone Adhesives Hold!

The exceptional durability of Dow Corning pressure sensitive silicone adhesives makes them dependable for tapes, sealants, spray-on coatings, bonding materials and splicing agents. Perhaps there's a special property you need in an adhesive . . . or a special *combination* of properties? Here, briefly, are the properties of Dow Corning silicone adhesives. Silicones may offer exactly what you need.

They stick anywhere! At temperatures ranging from —80 to 500 F, pressure sensitive silicone adhesives stay stuck and don't deteriorate. They withstand the effects of moisture, oxidation, corrosive chemicals, weathering, arcing, corona and fungus. For electrical applications, silicone adhesives provide excellent dielectric strength.

As tapes. Dow Corning silicone adhesives are used with most backing materials. Now readily available from several manufacturers are tapes with backings of glass cloth, Teflon, Mylar, aluminum foil, silicone rubber and combinations of these materials. Typical applications include: high temperature electrical insulation; bonding, splicing, and sealing; masking in chemical milling; release surfacing, and electroplating.

Or alone. For a fastening adhesive in rugged service, silicones may be your answer. For example, silicone adhesives in combination with asbestos fibers are used to coat and insulate hot air ducts in aircraft. Other tough applications: sealing ends of heat elements in appliances, bonding mica and asbestos panelboard, and bonding silicone rubber to the coils of electrical equipment.

Dow Corning Silicones may well be your adhesive of the future. For more technical information or assistance, write Dept. 2212.

Available now — list of manufacturers supplying pressure sensitive tapes with silicone adhesives.

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Business
Newsletter

CHEMICAL WEEK
December 17, 1960

The year is closing on a fairly high plateau, though substantially below last winter's expectations.

A few companies are enjoying an upsurge that's lasting right through this fourth quarter. Hercules Powder and Baxter Laboratories are looking for 10-15% increases in 12-month earnings; and two plastics firms—Foster Grant and Fluorocarbon Co.—are posting 20% gains.

Over-all, sales of chemicals and allied products for the first 10 months are up 9.4%, relative to last year. Ten-month cash dividend payments climbed 4.8%, to $770.9 million.

In capital expenditures, trends are mixed. Most branches of the chemical process industries have cut back slightly on capital spending plans over the past few months. Among makers of chemicals and allied products, new appropriations during the third quarter for plant and equipment dropped 33% from the year-ago quarter, to $398 million, according to a National Industrial Conference Board survey for *Newsweek* magazine. Nevertheless, the chemicals and allied products industry expects to start the new year with first-quarter capital spending at a seasonally adjusted annual rate of $1.7 billion—compared with its $1.45 billion rate in first-quarter '60.

•

This week's blizzard crimped front-office operations more than it cut into production work in East Coast states. One New York-based chemical company counted only 80 employees present Monday morning out of a headquarters staff of 150; and nearly all of the 80 checked out at noon to get home before nightfall.

•

Monsanto is identifying what it will produce at Addyston, O. *(CW, Dec. 3, p. 25).* Output—as predicted *(CW Market Newsletter, Aug. 13)*—will include a series of styrene-acrylonitrile copolymers (tradenamed Lustran A) and terpolymers of styrene, acrylonitrile and butadiene (Lustran I). Capacity of the new plant—slated to be onstream late in '61—is put at 50 million lbs./year.

•

Undisclosed U.S. and Canadian interests are trying to buy up minority stock in Canadian Chemical Co., which is 82%-owned by Chemical Ltd. (Montreal), a subsidiary of Celanese Corp. (New York). If all minority stockholders accept the offer of $5.75/share, the six-months-plus-10-days options will cost a total of $734,000.

•

Watch for growth in aromatic petroleum resins next year. Indications that an upsurge is in the offing for these polymers based on mixed alkyl-aryl compounds come from two developments last week:

- Amoco Chemicals Corp.—A branch of Standard Oil of Indiana

(Chicago)—is going to double capacity for its Panarez hydrocarbon resins at Texas City, Tex., will also install new equipment "to supplement the existing line with improved products." Principal uses: to modify film properties in paints, in rubber formulations, floor tiles and hardboard saturates.

• Kenrich Petrochemicals (Queens, N. Y.)—whose petroleum resins are gaining increased usage in wire insulations and which has been planning to go into manufacture of such insulating compounds—will acquire Laribee Wire & Equipment Corp. (Camden, N. Y.), subject to ratification by Kenrich stockholders Dec. 27. Kenrich also is hoping its resins will be adopted for use in European-made auto tires during '61.

•

France's business boom has evidently been unaffected by the bleak prospects in Algeria. After some slowing down this summer, business activity is perking again. But the major political upheavals, especially if they include armed outbreaks in France itself, could undermine business confidence and spur retrenchment.

Prospects were darkened by this weekend's bloody riots in Algeria, which forced President Charles de Gaulle to cut short his tour there. De Gaulle's failure to end the Algerian war would mean greater opposition from the extreme Right faction and from the Left could bring down his government and plunge France into chaos.

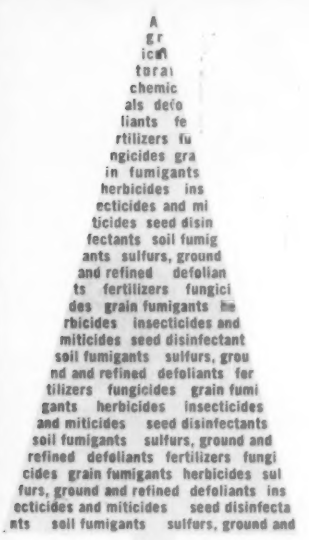
•

Sales of U.S. companies' overseas manufacturing affiliates rose 15% between '57 and '59, a new Commerce Dept. report reveals. Chemicals are among the leading products in this boost. All told, U.S. firms now employ more than 3 million workers and produce $35 billion worth of commodities in foreign countries.

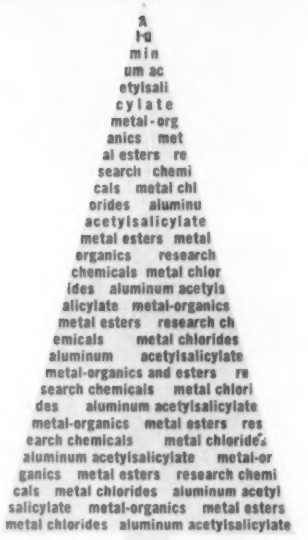
This week there were more overseas moves by U.S. chemical firms. Smith Kline & French Laboratories has formed a new German company with Roehm & Haas G.m.b.H. (Dormstadt). (The latter has no business connection with the U.S. Rohm & Haas). The new joint subsidiary will take over the German parent's existing pharmaceutical business and the sale of SKF products in Germany and Austria. Roehm & Haas' main production line is plastics.

Swift and Borden Chemical Co., Borden Chemical Co.'s Australian affiliate, is building a $250,000, 13-million-lbs./year formaldehyde plant in Sydney, next to its existing thermosetting resins plant. About 70% of the new plant's output will be used captively.

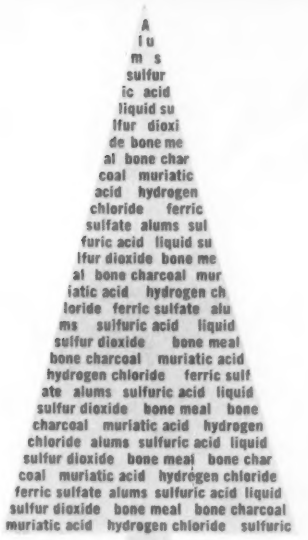
And Glidden Co. plans to step up its overseas activities, President Dwight Joyce told stockholders at their annual meeting last week. Glidden is building up in Latin America, and will soon move into Europe. Among several deals in the works: acquisition of a German paint company.



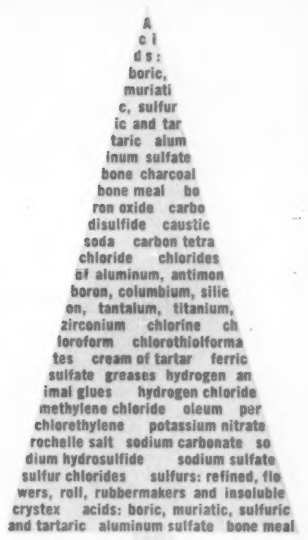
AGRICULTURAL CHEMICALS DIVISION



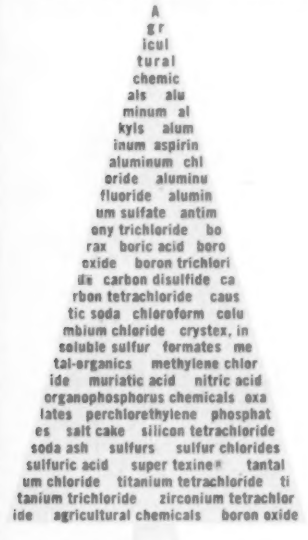
ANDERSON CHEMICAL DIVISION



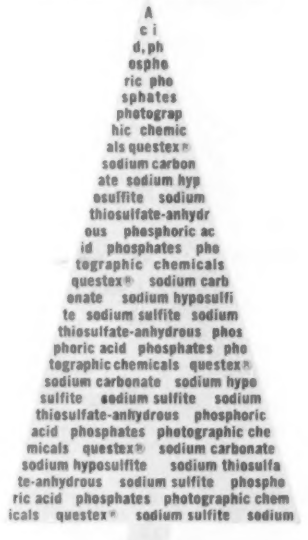
CONSOLIDATED CHEMICAL INDUSTRIES DIVISION



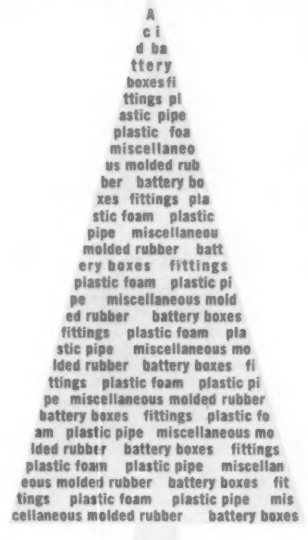
INDUSTRIAL CHEMICALS DIVISION



INTERNATIONAL DIVISION



A. R. MAAS CHEMICAL DIVISION



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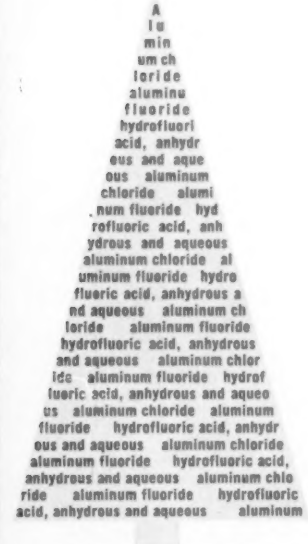

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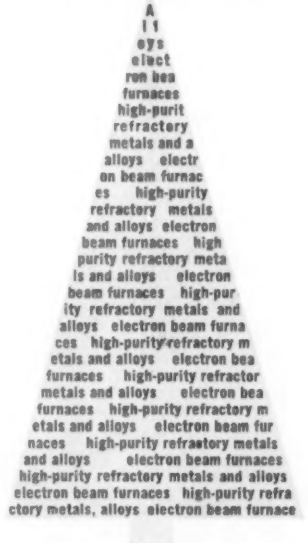
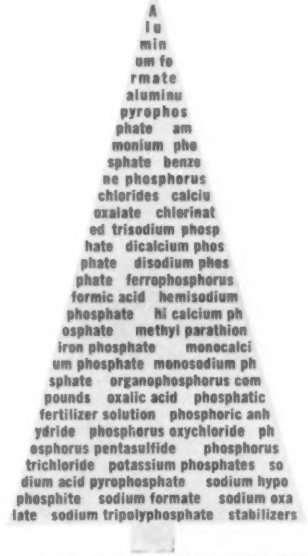
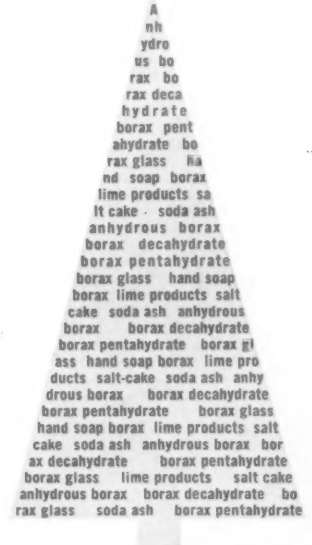


STAUFFER METALS COMPANY



VICTOR CHEMICAL WORKS DIVISION



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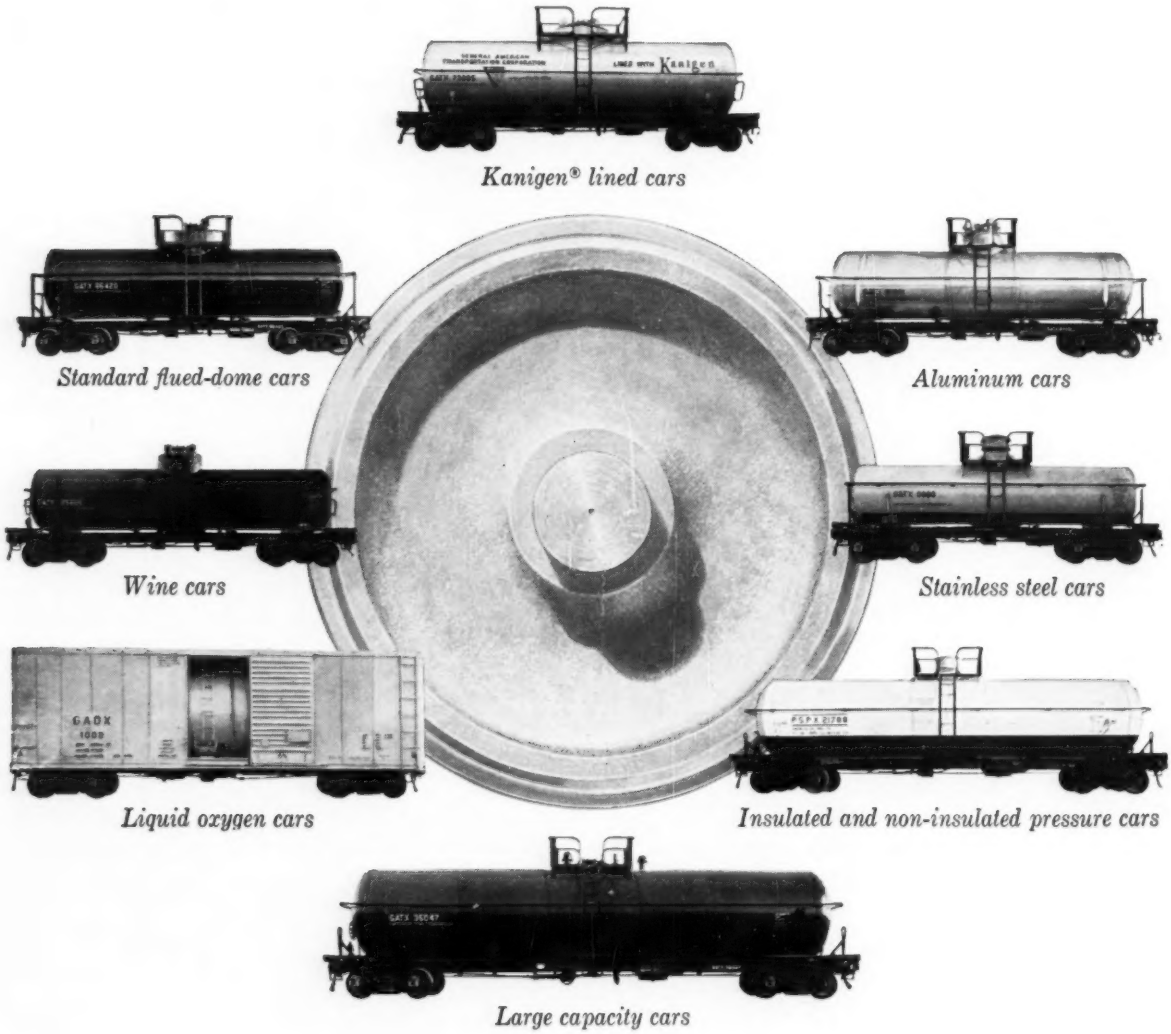

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Who'll Buy Canada's Sulfur?

• 'Sour gas' sulfur is piling up in Canada, because of high shipping costs to big markets.

• But by '64 new export opportunities could allow producers to move 1 million tons/year.

Surplus sulfur is piling up at a fast clip in western Canada—and after next year the sulfur hills will be growing even faster. By '62—when output will be at least triple the '60 rate—more than half of production will be earmarked for the stockpile. How to profitably market this sulfur surfeit is the challenge facing Canadian producers.

Output will skyrocket because sulfur is stripped out of every cubic foot of "sour gas" processed in western Canada—and there's a growing demand for the area's vast reserves of natural gas. The mounting stockpiles reflect freight rates that bar marketing in the big consuming centers—all of which are at least half a continent away.

Four new sulfur recovery plants are now being planned or built in Alberta. All are targeted to be in operation before the end of '61. At that time they will collectively add 1 million long tons/year to Canada's present 700,000 l.t/year sulfur capacity.

Alberta's sulfur production (British Columbia produces some, output from other provinces is negligible) in the first eight months of '60 averaged 875 l.t/day, a Canadian Petroleum Assn. spokesman notes. "By '62, with the advent of greatly expanded export markets for natural gas," he predicts, "this will climb to nearly 5,000 l.t/day." In comparison, he says, the total Canadian sulfur market amounts to only about 1,100 l.t/day.

Freight barrier: Canada imported more than 12 times as much sulfur as it exported in '59. So far this year, imports are less than twice exports. But imports—from the United Kingdom, Mexico and the U. S.—will continue to supply eastern Canada; the long overland shipment by rail from Alberta is prohibitive.

It costs a minimum of $12/ton to move Alberta sulfur to the nearest waterways—either westward to the Pacific Ocean, or eastward to the Great Lakes. Result: except in northern California and the Pacific Northwest, Canadian sulfur has not yet been able to compete with the Gulf Coast and Mexican products.

"Modest" trial shipments have, however, been moving into the Great Lakes region in the past few months for use in fertilizer operations there. Far East markets such as India, Australia and New Zealand—while growing rapidly—don't offer enough of a shipping advantage to Canadian producers to relieve much of the mounting pressure. Red China, however, may open up as one potential world outlet that Canadians could profitably pursue. Over-all, Canadian producers are hoping that in—two to three years they'll be supplying a 1-million-l.t./year market.

One move that could dent the landlocked sulfur stocks—but not for some time, at least—is a sulfur pipeline into the U.S. (*CW, June 4, p. 21*). Pembina Pipe Line, reinforced with additional research funds from some other oil companies, is probing the feasibility of sending elemental sulfur as a slurry in a liquid hydrocarbons stream through an Alberta-to-Illinois pipeline.

While many industry people consider the technological barriers too great, a Pembina spokesman contends that current research (at the University of Alberta and the Colorado School of Mines) could yield with the necessary solutions during the coming year. If so, optimists believe, the line could become a reality within two years. Pipeline proponents feel that this is the only chance to keep transportation costs low enough to compete with Gulf Coast producers.

Producers Multiply: The first sulfur shipment from Canadian Oil companies' 80-l.t./day recovery plant left Innisfail Field in central Alberta only last week. The plant—which started operations in November—has contracted half of its sulfur production to Shell Oil Co. for eventual sale in the Edmonton industrial area.

Pan American Petroleum, heading a three-company team, has started construction of its $26-million gas plant in Windfall Field near Whitecourt, Alta. Starting in the late fall of '61 it will be recovering sulfur at a rate of 650 l.t./day, to fulfill a 25-year gas export contract. In approving the project, the Alberta Oil and Gas Conservation Board specified that at least 93.5% of the sulfur contained in the gas must be recovered.

Shell Oil will supplement its existing Canadian sulfur plant with one in the Pincher Creek district of southern Alberta. Also to be completed before the end of '61 it initially will recover 900 l.t./day.

Jefferson Lake Petrochemicals—already operating at Peace River, B.C.—is planning two more sulfur recovery plants, both in Alberta. Both are expected to be finished by Nov. '61. Its East Calgary project is a partnership with Mobil Oil of Canada, will turn out 700 l.t./day. The proposed Savanna Creek plant near Coleman, Alta., will recover about 300 l.t./day.

Still more recovered sulfur will emerge in Alberta if permission is granted for development of the Athabasca oil sands. Last month one application—that of Great Canadian Oil Sands—was disallowed; but ob-

servers think that Athabasca stands a strong chance of getting a go-ahead within a year, on the basis of extensive research by a team of oil companies (headed by Cities Service). Alberta's oil board has stressed that future commercial development in the region would be "conditional on the recovery of a substantial portion of the sulfur."

Pile-up Continues: By the end of '60 Canadian stockpiles will add up to some 350,000 tons—about 125,000 tons more than '59 inventories, and nearly as much as total Canadian sulfur production in '60. Production (and inventories) will really begin to soar by '62. Output could amount to 500,000 l.t. of sulfur in '61, 1.5 million in '62, and 2.5-3 million in '65.

A few Canadian producers assert that they aren't worried, are confident of long-term returns. But for the next four to six years, at least, mountains of sulfur will be growing in Alberta. The sulfur won't deteriorate; but as one sulfur man laments, "it just sits —and does no good."

Rolling On in Resins

Rexall Chemical Co. (division of Rexall Drug and Chemical) is expanding in polystyrene and going into polyethylene on a resale basis, pending completion of its polyethylene plant in early '62.

In New York's Chemists' Club last week Rexall's divisional President Ralph Knight told of plans to build a 25-million-lbs./year polystyrene plant in the Midwest by mid-'61. This plant—and the Seamco plant at Holyoke, Mass., and the Granada plant at Santa Ana, Calif. — will reportedly give Rexall a total polystyrene capacity of 70 million lbs./year.

The Seamco and Granada tradenames will be dropped and all Rexall resins will be branded Elrex—coined from Rexall and El Paso Natural Gas. The latter supplies the raw materials, will have (through a subsidiary) a 50% interest in the polyolefin venture.

Carl Setterstrom, Rexall vice-president for marketing, said the company expects to market "millions of [illegible] poly is still the largest producer in the country.

The founders of CPR are mainly technical men, and they are counting heavily on their know-how. CPR Pres-

High on Hydrogen

Union Carbide's Linde Co. division last week clinched its position as world's largest private-enterprise producer of liquid hydrogen by winning a $31-million contract to supply about 60 million lbs. over the next five years. Destination: rockets.

To carry out this commitment, Linde—which last year built a 4.5-million-lbs./day liquid hydrogen plant at Torrance, Calif.—will design, engineer, prefabricate and supervise erection of a more-than-20-million-lbs./year plant at Fontana, Calif.

This project — reputedly cost was "considerably in excess of $10 million"—is expected to be onstream by June '62. Output will go to various West Coast plants for use in upper stages of Atlas, Centaur and Saturn rockets, and in other activities of the National Aeronautics and Space Administration.

The new plant at Fontana will essentially be a scale-up of the Torrance plant, except for initial handling of the feedstock. The Torrance plant runs on a hydrogen-methane stream piped in from an adjacent plant of Union Carbide Olefins Co., while the new plant will use coke-oven gas from Kaiser Steel's Fontana Works.

Until the new plant is operating, Linde will supply NASA's West Coast liquid hydrogen needs by hauling the highly volatile fluid more than 2,700 miles from the 21-million-lbs./year West Palm Beach, Fla., plant. The latter is owned by the U.S. Air Force and operated by Air Products (Allentown, Pa.). For this task, starting next June, Linde will use specially designed 7,800-gal. trailer trucks and 25,000-gal. railroad tank cars.

Linde President William Nicholson foresees only modest growth of the now-small commercial market for liquid hydrogen. The company, however, is confident that liquid hydrogen will be the workhorse fuel for space vehicles (not only for upper stages but also as a booster propellant), which accounts for the extra capacity it will build into the Fontana plant.

Linde's Nicholson: A second commercial venture in liquid hydrogen.

the coast should reach 10 million lbs./year in a couple of years—possibly big enough to spark chemical companies' interest in setting up a toluene diisocyanate plant there.

Merging for Know-how

Mainly to bolster its position as leading producer of monosodium glutamate (MSG), International Minerals & Chemical Corp. (Skokie, Ill.) is acquiring Bioferm Corp. (Wasco, Calif.) The latter specializes in fermentation chemistry, is a pioneer in microbial insecticides and a principal producer of vitamin B .

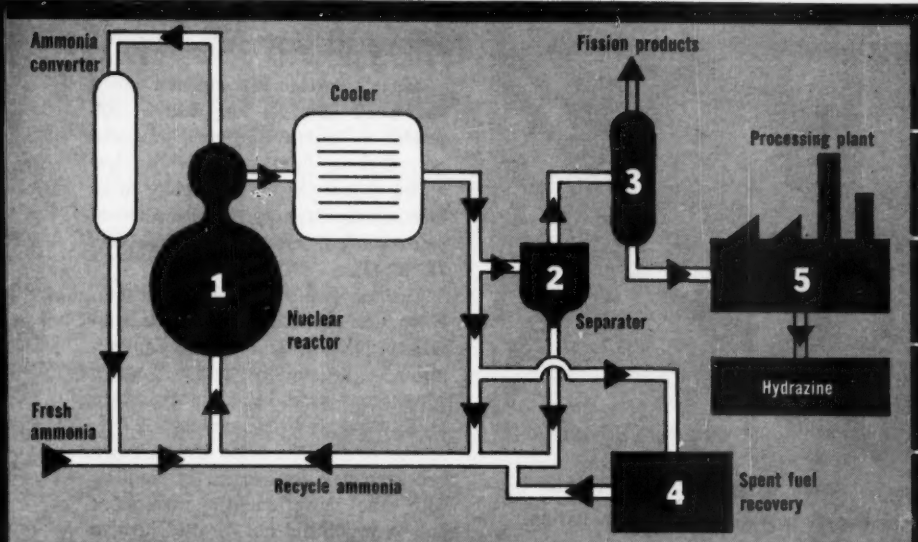
Joining forces with Bioferm is expected to help IMC in its contemplated swing to fermentation production of MSG. This process — which IMC is convinced offers substantial savings over conventional methods— has been tried in a pilot plant in the Chicago area. It will now be tested on a larger scale at the Bioferm plant at Wasco.

If the process proves out there, it will likely be installed at IMC's main MSG plant at San Jose, Calif. Feedstock is believed to be by-product beet sugar liquors.

Also, IMC President Tom Ware says the acquisition—terms of which are still being worked out—will give his company "new opportunities in the agricultural market through insecticides and feed supplements, and open completely new avenues of diversification." At present, Bioferm's microbial insecticide — tradenamed Thuricide — is being marketed by Stauffer Chemical (*CW Technology Newsletter, April 23*). IMC's dicalcium phosphate and Bioferm's vitamin B_{12} are sold as feed supplements, and Bioferm has processes for livestock and poultry-feed antibiotic supplements.

Up to now, vitamin B_{12} has been Bio[illegible] principal product and the com[illegible] has estimated [illegible] demand at about 160,000 tons, which would mean an operating rate of 88%. Thus any significant increase in demand would leave room for more capacity.

HYDRAZINE: Will it buy the five keys to unlock radiation chemistry?



1 Reactor design
2 Separating nuclear fuel from product
3 Disposal of fission products
4 Recovery of spent fuel
5 Processing plant

Nuclear Hydrazine Goes Critical

Last week Aerojet General Nucleonics (AGN) began the high-neutron flux tests that signal the final stages of its program to use nuclear energy to convert ammonia into hydrazine.

The tests at the Livermore, Calif., Pool Type Reactor are designed to measure the efficiency of the proposed fissio-chemical reaction. The work is being done under contract to the USAF's Air Materiel Command, Aeronautical Systems Center (AMC).

Previous low-neutron flux tests made in AGN's reactor indicated that hydrazine could be produced via this route for as little as 25¢/lb. compared to the $2/lb. tag for hydrazine from its hydrate (*CW Technology Newsletter, Dec. 10*).

AGN experts, in Washington for the American Rocket Society meetings, emphasized that the final Livermore tests are actually but the first ones in a long range program. The Air Force AMC, they said, sees hydrazine as the most likely product for opening the whole field of fissio-chemistry. Experience gained here can be applied in the fissio-chemical production of such compounds as nitric acid, ethylene glycol (*CW Dec.*

In the program which includes the Livermore test, researchers will establish the theoretical energy requirements ("G" number) for the reaction. Although more-than-theoretical energy is needed in actuality (since it's impossible to put the fission-product energy at the reaction site), micron-sized uranium particles should keep waste energy to less than 10%. In the case of hydrazine, G has been estimated to be between 1 and 4; at 1, a plant producing about 50 million lbs./year of hydrazine could make it for 35¢/lb.; at 4, for 15¢/lb. Such a plant would cost $15-20 million, of which about two-thirds would be in the reactor complex and one-third would be in the processing unit.

If the Air Force decides to go ahead, next steps would probably include: (1) a pilot plant using a non-critical nuclear reaction; (2) a pilot unit with a self-critical nuclear reaction, and (3) a commercial design. AGN has declined to comment on the time and cost of such a program, but industry estimates it would take four years, cost $40-50 million.

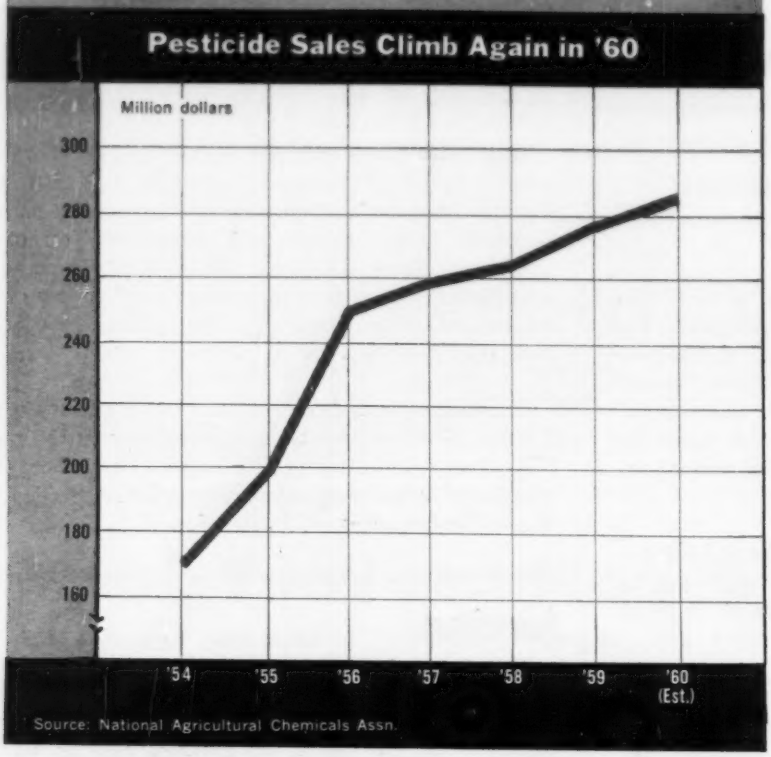
DIMENSION

NUCLEAR FISSION provides energy for endothermic chemical reactions in the same sense as do electrolysis or direct heat. Fission energy, however, goes directly into the reacting chemical molecules as kinetic energy of the fission particles. It thus avoids many conventional difficulties such as transferring high temperatures to the actual reaction site, heat loss, etc.

"G number" is a term used to classify a reaction in terms of its theoretical energy needs—key to over-all production costs. Technically, G is the ratio: molecules of product/100 electron volts. In a "G=1" reaction, for example, each atom of fissioned uranium will produce enough energy to make 1.67 million molecules of chemical. G for the fissio-chemical production of nitrous oxide from nitrogen and oxygen is 7.3-7.4; it is 2 for converting methanol into ethylene glycol.

Stauffer Chemical Co. (New York), is building its third sodium sulfate production unit at Westend, Calif. The new unit—slated onstream by next summer—will boost the company's capacity to 200,000 tons/year. Divisional

has consolidated its five subsidiaries in the United Kingdom into one organization. Winthrop Group Ltd. Marketing will be tied in with Sterling's recently organized subsidiaries on the Continent.



Pesticides: Fast Pace for '61

Sales of pesticides are expected to hit an estimated $285 million (at the basic manufacturers' level) this year, an increase of 3%, or $7 million over '59 sales, according to the National Agricultural Chemicals Assn.'s year-end report. The '61 outlook: additional gains.

Some ups and downs were experienced in different pesticide categories due to variations in the weather and the severity of pest infestations. Insecticide sales for example, are off somewhat in '60, while the generally wet, cool season helped to lift sales of fungicides and herbicides.

Herbicide sales were reported up 7% over '59, with an outlook for continued strong growth in this area during the next few years. Reason: the wider use of these products to control specific weeds, brushes and grasses. Rising labor costs for control of these types of plants along roadsides, in recreation areas, on lawns and in public parks, as well as in agricultural work, has promoted the use of herbicides.

Exports Hold Up: The foreign market continues to be a large outlet for U. S.-made pesticides. Value of pesticide exports in the first half of '60 totaled $47 million. This compares with $86 million worth of exports during the full year '59.

DDT made up more than 50% of U.S. pesticide exports. Much of this material went into the overseas malaria eradication programs. Large amounts of fungicides, fumigants, herbicides and other insecticides were also exported during the first half of the year.

Profit Squeeze: While the pesticides sales curve moves upward, profit margins have been narrowing. Besides the higher costs of labor, raw materials and distribution, the agricultural chemical firm is faced with sharply rising expenses for research and development.

Not only is the discovery of new products becoming more expensive; expenditures for product testing to meet the ever increasing requirements for government approvals are also on the rise (*see p. 41*).

Usually more than one federal agency and several state authorities must approve a new product before it can be sold. The amount and detail of research data required to obtain these various government approvals have been increasing each year.

Various companies report that it now costs between $1-1.5 million to research and test a new product and put it on the market. This does not include the additional expenses of advertising and distribution.

Net result: curtailment or even complete liquidation of research activities in some firms. Those manufacturers that have continued or expanded their research programs have tended to concentrate on products and the use areas which offer major sales potentials.

In addition, the wider use of pesticides has been accompanied by demands from nonscientific public bodies that want additional research on the pesticide industry's products. During '60, a broader effort was made to inform the public on how thoroughly pesticides are now tested, and the adequacy of public protection against possible misuse of these products.

To maintain profitability in the face of narrowing profit margins, efforts are now under way to improve the effectiveness of marketing operations. During '60, a survey disclosed that most farmers (largest single outlet for pesticides) failed to use pesticides in the optimum amount, due to lack of application equipment know-how. Closing the farmers' "knowledge gap" opens the opportunity for a broad expansion of sales in '61—to people who are already the industry's best customers.

One moderating influence in '61 may result from the federal government's attempt to drastically reduce farm surpluses, either by taking land out of production, or limiting off-farm sales. Effect of such a program cannot be predicted, however.

Outlook: By '75, pesticide sales may well total $1 billion, according to Jackson V. Vernon, vice-president of Food Machinery and Chemical Corp. and former president of National Agricultural Chemicals Assn.

Growing population; the concomitant push for more efficient food and fiber production both in the U.S. and abroad; the increasingly diminishing supply of farm manpower; the current loss of $13-15 billion/year in crops, due to pests; and the trend toward creating a "pest-free" outdoors—all will continue to boost pesticide usage.

Show Biz Builds the Image

June Allyson, Eddie Albert help Du Pont and Kaiser.

The idea of coupling the prestige value of well-known people with corporate public relations and promotion programs may be getting new emphasis from chemical process companies. That's the view one well-known entertainer—Chester H. Lauck, "Lum" of the famed radio series of "Lum and Abner"—expressed last week, and his thesis is borne out in interviews with other corporation promotion experts.

Lauck, now executive assistant to Continental Oil Co. President L. F. McCollum, spends full time on the road regaling audiences with his rural Midwest humor and commenting on the benefits of free enterprise (with special emphasis on the views of the oil industry). Last week, for example, he appeared in New York's Chemists' Club at a dinner meeting for members of the Chemical Industries Assn. and their wives.

New Emphasis: Lauck says he knows of several companies that are looking for men like himself to do public relations work. And chemical process companies indicate renewed interest in the approach, which is by no means a new technique. Last August, for example, Kaiser Industries, parent of Kaiser Aluminum & Chemical Corp., appointed stage, screen, TV star Eddie Albert vice-president for special projects. Among other things, Albert advises the company on its two national television shows, and is taking part in planning an education-by-video program Kaiser is contemplating in Hawaii.

The celebrity practice may be shifting in its focus. Not many years ago well-known public figures often were tied in with direct advertising programs, usually in testimonials of company products. Now, says management, public figures appear more frequently in the less-commercial roles.

At Union Oil Co., for example, Bill Thompson—who used to play "Old Timer" on the "Fibber McGee & Molly" program—is the company's manager of public service. He will appear before any group that will guarantee an audience of at least 100. His services are free, and his talks run the gamut of public service talks, mainly

Continental Oil's Chet Lauck (Lum and Abner's Lum) flavors economics pitch with rural humor.

CW PHOTO—WILLIAM ROSENBLUTH

aimed toward juvenile audiences.

Until last March, Union also employed Elroy "Crazylegs" Hirsch, former Los Angeles Rams end, to organize youth sport clubs in the firm's marketing area.

Specialists: National renown is not a necessity in such programs. Many of the celebrities are well known within limited circles. Many tire companies use top-notch race drivers—e.g., Goodyear employs Mickey Thompson (who has driven a car at 406 mph.) for spot appearances in key marketing drives; and for Firestone Tire, Peter DePaolo, first man to go 100 mph. in a racing car, lectures high school audiences, driver training classes and Firestone-sponsored 4-H auto care groups on driver safety. Several companies have executives considered to be outstanding speakers, who are regularly called on for appearances.

Other performers are in more direct promotion. Du Pont, for instance, calls on movie idol June Allyson, who stars in the company's Du Pont Show, to appear at fashion shows or other marketing functions. Olin Mathieson's Winchester Arms Division and Du Pont's Remington Arms Co. have both at one time hired well-known shooters to appear at county fairs and exhibitions to demonstrate their prowess with company products. These programs have been discontinued, however, because of their high cost.

Cost: Cost, of course, is a major factor in mobilizing such a program. Chet Lauck makes about 200 speeches a year in all sections of the U. S., chalks up an expense account in the neighborhood of $20,000. Reliable estimates indicate that expenses of sending shooting experts to various fairs and exhibitions on a year-round basis are $25-30,000. These expenses of course, are exclusive of salaries. To get well-known people, such as Lauck or Albert, probably costs a firm between $65,000 and $150,000 in salaries, depending on the person's fame.

In addition to being expensive, celebrity programs raise other problems.

Scheduling is a major one, usually being done by the celebrity's own staff, and often more than a year in advance. Lauck has traveled 136,000 miles this year, sometimes finds himself virtually commuting from one coast to the other.

Other performers must meet specific meeting dates of societies of importance in their company's fields, have to tailor other scheduling accordingly. In addition, there may be a prestige loss when a speaker must turn down a date because an audience can't be guaranteed, or when it does not constitute a market for the company's products or ideas.

But as company diversification continues toward consumer markets, and as companies intensify their public-image programs, look for modest increases in the employment of celebrities to augment established programs. Increases will be largely where there is a definite consumer interest in either the company's products or its philosophy.

First for Cuban Relief

Petrochemical producer Texaco, Inc., is pacesetting industry action in a new campaign to aid refugees from Cuba. Texaco has made the first major corporate contribution — $100,000 — toward the Cubans' relief. The money will be divided among the Spanish Center and other Miami, Fla., organizations, and the International Rescue Committee.

Tracy Voorhees, career government official recently named coordinator of aid for Cuban refugees by President Eisenhower, said Texaco's gift is an indication that private firms would back his plea for similar help.

Last June Texaco lost $55 million in assets that were seized by Castro's Cuban government.

LABOR

Oil Bargaining: Oil, Chemical & Atomic Workers Union has declared next week (Dec. 19-23) Collective Bargaining Week in the oil industry. Union President O. A. Knight has called on OCAW oil locals to simultaneously arrange negotiating sessions during the week on every OCAW oil contract. "We want every oil company at the bargaining table at one time," Knight says. "We want them to know that oil workers are united behind this drive for an 18¢/hour general wage increase." The union considers current offers of 5% (about 14.5¢/hour) by oil companies as unsatisfactory, mainly because the offer is tied to a two-year contract without a wage reopening clause.

ASSOCIATIONS

Carl A. Gerstacker to president, **Chester M. Brown** and **Arthur P. Kroeger** to vice-presidents; **Robert L. Bateman** to treasurer, and **Louis F. Loutrel, Jr.,** and **Carl S. Oldach** to board of governors; Synthetic Organic Chemical Manufacturers Assn. (SOCMA) (New York).

KEY CHANGES

Robert W. Johnson, Jr. to president, parent company, **D. D. Quillian** to vice-president, Chicopee Manufacturing Co., subsidiary, Johnson & Johnson (New Brunswick, N.J.).

David J. Fitzgibbons to board of directors, Sterling Drug Co. (New York).

Robert W. Dowling, Walter Hoving, William L. Russell to board of directors, Chemway Corp. (Wayne, N.J.).

Neal M. Draper to vice-president, National Aniline Division, Allied Chemical Corp. (New York).

Walter A. Smith to executive vice-president, Formica Corp., subsidiary, American Cyanamid Co. (New York).

R. C. Woerner to vice-president, Petro-Tex Chemical Corp. (Houston).

Robert D. Frey to vice-president and manager, Midwestern division, Puritan Chemical Co. (Atlanta).

Rudolph Cubicciotti to administrative vice-president, Witco Chemical Co., Inc. (New York).

G. R. Milne to president, **B. R. Krashin** to vice-president, marketing, **R. T. Lund** to vice-president, operations, **R. A. Speck** to vice-president, distribution, **J. M. Tinnon** to vice-president, engineering, Air Reduction Chemical and Carbide Co., newly formed division, Air Reduction Co., Inc. (New York).

Hugh D. Jordan, H. A. Raymond, Jr., Allie E. Salls, Conrad T. Waldie, Jr., and **J. J. McDonald** to vice-presidents, Brown Co. (Berlin, N.H.).

John K. McKinley to general manager, Petrochemical Dept., Texaco, Inc.

Who'll Buy Canada's Sulfur?

• 'Sour gas' sulfur is piling up in Canada, because of high shipping costs to big markets.

• But by '64 new export opportunities could allow producers to move 1 million tons/year.

Surplus sulfur is piling up at a fast clip in western Canada—and after next year the sulfur hills will be growing even faster. By '62—when output will be at least triple the '60 rate—more than half of production will be earmarked for the stockpile. How to profitably market this sulfur surfeit is the challenge facing Canadian producers.

Output will skyrocket because sulfur is stripped out of every cubic foot of "sour gas" processed in western Canada—and there's a growing demand for the area's vast reserves of natural gas. The mounting stockpiles reflect freight rates that bar marketing in the big consuming centers—all of which are at least half a continent away.

Four new sulfur recovery plants are now being planned or built in Alberta. All are targeted to be in operation before the end of '61. At that time they will collectively add 1 million long tons/year to Canada's present 700,000 l.t/year sulfur capacity.

Alberta's sulfur production (British Columbia produces some, output from other provinces is negligible) in the first eight months of '60 averaged 875 l.t/day, a Canadian Petroleum Assn. spokesman notes. "By '62, with the advent of greatly expanded export markets for natural gas," he predicts, "this will climb to nearly 5,000 l.t/day." In comparison, he says, the total Canadian sulfur market amounts to only about 1,100 l.t/day.

Freight barrier: Canada imported more than 12 times as much sulfur as it exported in '59. So far this year, imports are less than twice exports. But imports—from the United Kingdom, Mexico and the U. S.—will continue to supply eastern Canada; the long overland shipment by rail from Alberta is prohibitive.

It costs a minimum of $12/ton to move Alberta sulfur to the nearest waterways—either westward to the Pacific Ocean, or eastward to the Great Lakes. Result: except in northern California and the Pacific Northwest, Canadian sulfur has not yet been able to compete with the Gulf Coast and Mexican products.

"Modest" trial shipments have, however, been moving into the Great Lakes region in the past few months for use in fertilizer operations there. Far East markets such as India, Australia and New Zealand—while growing rapidly—don't offer enough of a shipping advantage to Canadian producers to relieve much of the mounting pressure. Red China, however, may open up as one potential world outlet that Canadians could profitably pursue. Over-all, Canadian producers are hoping that in—two to three years they'll be supplying a 1-million-l.t./year market.

One move that could dent the landlocked sulfur stocks—but not for some time, at least—is a sulfur pipeline into the U.S. (*CW, June 4, p. 21*). Pembina Pipe Line, reinforced with additional research funds from some other oil companies, is probing the feasibility of sending elemental sulfur as a slurry in a liquid hydrocarbons stream through an Alberta-to-Illinois pipeline.

While many industry people consider the technological barriers too great, a Pembina spokesman contends that current research (at the University of Alberta and the Colorado School of Mines) could yield with the necessary solutions during the coming year. If so, optimists believe, the line could become a reality within two years. Pipeline proponents feel that this is the only chance to keep transportation costs low enough to compete with Gulf Coast producers.

Producers Multiply: The first sulfur shipment from Canadian Oil companies' 80-l.t./day recovery plant left Innisfail Field in central Alberta only last week. The plant—which started operations in November—has contracted half of its sulfur production to Shell Oil Co. for eventual sale in the Edmonton industrial area.

Pan American Petroleum, heading a three-company team, has started construction of its $26-million gas plant in Windfall Field near Whitecourt, Alta. Starting in the late fall of '61 it will be recovering sulfur at a rate of 650 l.t./day, to fulfill a 25-year gas export contract. In approving the project, the Alberta Oil and Gas Conservation Board specified that at least 93.5% of the sulfur contained in the gas must be recovered.

Shell Oil will supplement its existing Canadian sulfur plant with one in the Pincher Creek district of southern Alberta. Also to be completed before the end of '61 it initially will recover 900 l.t./day.

Jefferson Lake Petrochemicals—already operating at Peace River, B.C.—is planning two more sulfur recovery plants, both in Alberta. Both are expected to be finished by Nov. '61. Its East Calgary project is a partnership with Mobil Oil of Canada, will turn out 700 l.t./day. The proposed Savanna Creek plant near Coleman, Alta., will recover about 300 l.t./day.

Still more recovered sulfur will emerge in Alberta if permission is granted for development of the Athabasca oil sands. Last month one application—that of Great Canadian Oil Sands—was disallowed; but ob-

servers think that Athabasca stands a strong chance of getting a go-ahead within a year, on the basis of extensive research by a team of oil companies (headed by Cities Service). Alberta's oil board has stressed that future commercial development in the region would be "conditional on the recovery of a substantial portion of the sulfur."

Pile-up Continues: By the end of '60 Canadian stockpiles will add up to some 350,000 tons—about 125,000 tons more than '59 inventories, and nearly as much as total Canadian sulfur production in '60. Production (and inventories) will really begin to soar by '62. Output could amount to 500,000 l.t. of sulfur in '61, 1.5 million in '62, and 2.5-3 million in '65.

A few Canadian producers assert that they aren't worried, are confident of long-term returns. But for the next four to six years, at least, mountains of sulfur will be growing in Alberta. The sulfur won't deteriorate; but as one sulfur man laments, "it just sits —and does no good."

Rolling On in Resins

Rexall Chemical Co. (division of Rexall Drug and Chemical) is expanding in polystyrene and going into polyethylene on a resale basis, pending completion of its polyethylene plant in early '62.

In New York's Chemists' Club last week Rexall's divisional President Ralph Knight told of plans to build a 25-million-lbs./year polystyrene plant in the Midwest by mid-'61. This plant—and the Seamco plant at Holyoke, Mass., and the Granada plant at Santa Ana, Calif. — will reportedly give Rexall a total polystyrene capacity of 70 million lbs./year.

The Seamco and Granada tradenames will be dropped and all Rexall resins will be branded Elrex—coined from Rexall and El Paso Natural Gas. The latter supplies the raw materials, will have (through a subsidiary) a 50% interest in the polyolefin venture.

Carl Setterstrom, Rexall vice-president for marketing, said the company expects to market "millions of pounds" of polyethylene next year, buying various types of resins from several present producers (*CW Business Newsletter, Oct. 15*). Regional sales offices are being set up in Holyoke, Chicago, and Beverly Hills, Calif.

High on Hydrogen

Union Carbide's Linde Co. division last week clinched its position as world's largest private-enterprise producer of liquid hydrogen by winning a $31-million contract to supply about 60 million lbs. over the next five years. Destination: rockets.

To carry out this commitment, Linde—which last year built a 4.5-million-lbs./day liquid hydrogen plant at Torrance, Calif.—will design, engineer, prefabricate and supervise erection of a more-than-20-million-lbs./year plant at Fontana, Calif.

This project — reputedly cost was "considerably in excess of $10 million"—is expected to be onstream by June '62. Output will go to various West Coast plants for use in upper stages of Atlas, Centaur and Saturn rockets, and in other activities of the National Aeronautics and Space Administration.

The new plant at Fontana will essentially be a scale-up of the Torrance plant, except for initial handling of the feedstock. The Torrance plant runs on a hydrogen-methane stream piped in from an adjacent plant of Union Carbide Olefins Co., while the new plant will use coke-oven gas from Kaiser Steel's Fontana Works.

Until the new plant is operating, Linde will supply NASA's West Coast liquid hydrogen needs by hauling the highly volatile fluid more than 2,700 miles from the 21-million-lbs./year West Palm Beach, Fla., plant. The latter is owned by the U.S. Air Force and operated by Air Products (Allentown, Pa.). For this task, starting next June, Linde will use specially designed 7,800-gal. trailer trucks and 25,000-gal. railroad tank cars.

Linde's Nicholson: A second commercial venture in liquid hydrogen.

Linde President William Nicholson foresees only modest growth of the now-small commercial market for liquid hydrogen. The company, however, is confident that liquid hydrogen will be the workhorse fuel for space vehicles (not only for upper stages but also as a booster propellant), which accounts for the extra capacity it will build into the Fontana plant.

Merging for Know-how

Mainly to bolster its position as leading producer of monosodium glutamate (MSG), International Minerals & Chemical Corp. (Skokie, Ill.) is acquiring Bioferm Corp. (Wasco, Calif.) The latter specializes in fermentation chemistry, is a pioneer in microbial insecticides and a principal producer of vitamin B .

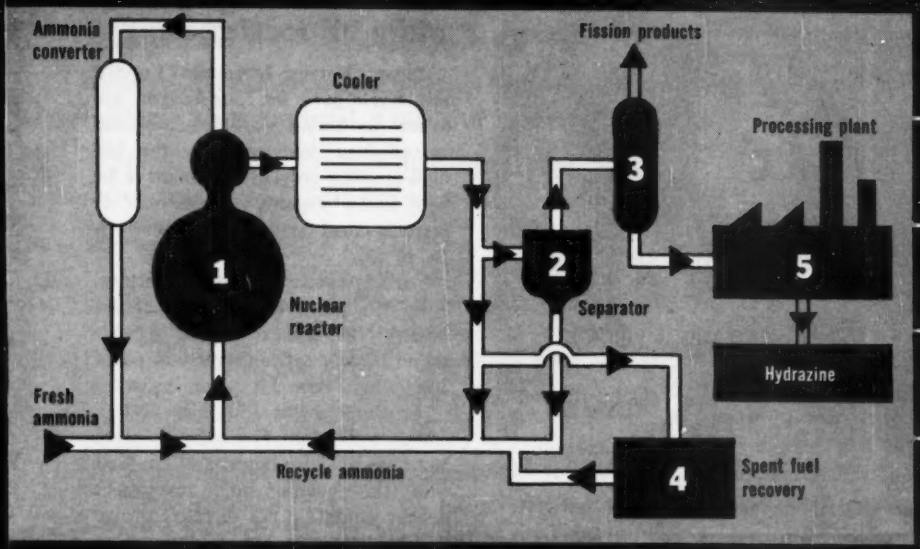
Joining forces with Bioferm is expected to help IMC in its contemplated swing to fermentation production of MSG. This process — which IMC is convinced offers substantial savings over conventional methods— has been tried in a pilot plant in the Chicago area. It will now be tested on a larger scale at the Bioferm plant at Wasco.

If the process proves out there, it will likely be installed at IMC's main MSG plant at San Jose, Calif. Feedstock is believed to be by-product beet sugar liquors.

Also, IMC President Tom Ware says the acquisition—terms of which are still being worked out—will give his company "new opportunities in the agricultural market through insecticides and feed supplements, and open completely new avenues of diversification." At present, Bioferm's microbial insecticide — tradenamed Thuricide — is being marketed by Stauffer Chemical (*CW Technology Newsletter, April 23*). IMC's dicalcium phosphate and Bioferm's vitamin B_{12} are sold as feed supplements, and Bioferm has processes for livestock and poultry-feed antibiotic supplements.

Up to now, vitamin B_{12} has been Bioferm's principal product, and the company is reported to have a particularly low-cost production process. Negotiations on terms for the IMC-Bioferm stock transfer are expected to be completed late this month.

HYDRAZINE: Will it buy the five keys to unlock radiation chemistry?



1 Reactor design

2 Separating nuclear fuel from product

3 Disposal of fission products

4 Recovery of spent fuel

5 Processing plant

Nuclear Hydrazine Goes Critical

Last week Aerojet General Nucleonics (AGN) began the high-neutron flux tests that signal the final stages of its program to use nuclear energy to convert ammonia into hydrazine.

The tests at the Livermore, Calif., Pool Type Reactor are designed to measure the efficiency of the proposed fissio-chemical reaction. The work is being done under contract to the USAF's Air Materiel Command, Aeronautical Systems Center (AMC).

Previous low-neutron flux tests made in AGN's reactor indicated that hydrazine could be produced via this route for as little as 25¢/lb. compared to the $2/lb. tag for hydrazine from its hydrate (*CW Technology Newsletter, Dec. 10*).

AGN experts, in Washington for the American Rocket Society meetings, emphasized that the final Livermore tests are actually but the first ones in a long range program. The Air Force AMC, they said, sees hydrazine as the most likely product for opening the whole field of fissio-chemistry. Experience gained here can be applied in the fissio-chemical production of such compounds as nitric acid, ethylene glycol (*CW, Dec. 19, '59, p. 74*), and the recovery of refractory metals from their ores.

The heat is on hydrazine, right now, because of its value as a rocket fuel (*CW, Feb. 27, p. 23*)

In the program which includes the Livermore test, researchers will establish the theoretical energy requirements ("G" number) for the reaction. Although more-than-theoretical energy is needed in actuality (since it's impossible to put the fission-product energy at the reaction site), micron-sized uranium particles should keep waste energy to less than 10%. In the case of hydrazine, G has been estimated to be between 1 and 4; at 1, a plant producing about 50 million lbs./year of hydrazine could make it for 35¢/lb.; at 4, for 15¢/lb. Such a plant would cost $15-20 million, of which about two-thirds would be in the reactor complex and one-third would be in the processing unit.

If the Air Force decides to go ahead, next steps would probably include: (1) a pilot plant using a non-critical nuclear reaction; (2) a pilot unit with a self-critical nuclear reaction, and (3) a commercial design. AGN has declined to comment on the time and cost of such a program, but industry estimates it would take four years, cost $40-50 million.

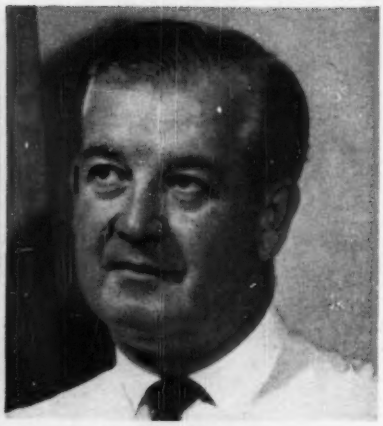
DIMENSION

NUCLEAR FISSION provides energy for endothermic chemical reactions in the same sense as do electrolysis or direct heat. Fission energy, however, goes directly into the reacting chemical molecules as kinetic energy of the fission particles. It thus avoids many conventional difficulties such as transferring high temperatures to the actual reaction site, heat loss, etc.

"G number" is a term used to classify a reaction in terms of its theoretical energy needs—key to over-all production costs. Technically, G is the ratio: molecules of product/100 electron volts. In a "G=1" reaction, for example, each atom of fissioned uranium will produce enough energy to make 1.67 million molecules of chemical. G for the fissio-chemical production of nitrous oxide from nitrogen and oxygen is 7.3-7.4; it is 2 for converting methanol into ethylene glycol.

Since G is an inherent property of a particular reaction, the value finally established is valid for all fissio-chemical reactors (although the over-all efficiency is also affected by the physical nature of the neutron source).

CPR's Dougan: Betting on technology to meet foam competition in West.



American Latex's Mallory: Still biggest in West, possibly in nation.

Stirring Two Foam Markets

The polyurethane foam picture is changing on both coasts this week. In the East, Stauffer Chemical (New York) and Hewitt-Robins (Stamford, Conn.) have set up a new foam producer, Stauffer-Hewitt, Inc. On the West Coast a new factor—CPR International Corp. (Los Angeles)—is threatening to inflame an already fierce competitive situation.

Stauffer-Hewitt, two-thirds owned by Stauffer, will operate Hewitt-Robins' Franklin, N.J., foam plant. Stauffer—which has wanted to diversify into plastics—will relieve Hewitt-Robins of much management and all financial responsibility for the foam plant, allowing H-R to concentrate on its materials-handling and power transmission products.

CPR International — staffed almost completely with ex-employees of American Latex Products Corp. (division of Dayco Corp., Dayton, Ohio) —is now producing a line of urethane foams.

CPR will be —along with American Latex, Urethane Corp. of California and Armour-Alliance Industries (subsidiary of Armour & Co.)—one of the four major polyurethane producers on the West Coast. American Latex' general manager, Glenn Mallory, insists his firm has not been hurt by the CPR defections, asserts that his company is still the largest producer in the country.

The founders of CPR are mainly technical men, and they are counting heavily on their know-how. CPR President Pat Dougan says that, aside from producing and selling foam, the firm will carry out basic research (some on a contract basis), do development work, offer technical service, and engineer machinery. At present the CPR staffers' technical prowess is helping the company in producing very-low-density material—its highest-density material is 1.2 lbs./cu.ft. Price competition in polyurethane is particularly cutthroat on the West Coast and the ability to produce a low-density foam, thus using less raw material per cubic foot of foam, is crucial in keeping profits up.

Several factors keep West Coast polyurethane competition edgy. To be practical, a polyurethane line must have a capacity of 100-200 lbs./minute. Also, it is not feasible to ship the finished product much more than 300 miles, because of its bulk.

The long-range outlook is good, though. CPR estimates that its sales will be $3.6 million the first year, double in two years, reach the $20-25-million range within five years.

West Coast polyurethane sales are now about 7 million lbs./year, including 2-3 million lbs. of rigid foams—a high percentage because of the use of rigid in West Coast defense industries, the biggest area of future West Coast polyurethane growth. The market on the coast should reach 10 million lbs./year in a couple of years—possibly big enough to spark chemical companies' interest in setting up a toluene diisocyanate plant there.

More PE for Japan

Japan's Foreign Investment Council last week gave its long-delayed approval to Union Carbide's proposed polyethylene joint venture—the last high-pressure polyethylene plant to be built under Japan's current plan of petrochemical expansion (CW, Nov. 26, p. 43).

Carbide and its 50-50 partner, Nitto Chemical, have set up a subsidiary, Nitto Unicar, with a capitalization of $10 million, and will put a 27,000-tons/year PE plant onstream at Kawasaki in the summer of '62.

Approval of the Nitto Unicar plans had been held up because of conflicts with the government's investment policy, which did not directly involve the polyethylene project but rather the plans of Toa Nenryo, who will supply the ethylene.

When Toa Nenryo, 55% owned by Stanvac, requested approval to build an ethylene plant, the government cited its policy not to permit plants to be built by companies more than half-owned by foreign interests. Carbide preferred not to build its own ethylene feedstock plants overseas, but it informally told the Japanese government it would do so if Toa Nenryo's plan was not approved. Then, last week, Stanvac told the government it would trim its interest in the subsidiary down to 50%. That triggered government approval of Carbide's original plans.

On Nov. 22, the government okayed the construction of another 27,000-ton/year polyethylene plant, this one by Mitsui Polychemical, 50-50 subsidiary of Du Pont and Mitsui Petrochemical.

Approval of the Carbide project may rule out for some time the go-ahead for the third pending U.S.-company-backed project — Asahi Dow's proposed plant. But its prospects have been brightened by the reported upward revision of the government's polyethylene demand.

New projects, including expansions by present producers Sumitomo Chemical and Mitsubishi Petrochemical, will bring capacity up to about 182,500 tons by '63. The government has estimated '63 demand at about 160,000 tons, which would mean an operating rate of 88%. Thus any significant increase in demand would leave room for more capacity.

rapid roundup

Rounding out the week's news of companies, expansions, and foreign developments.

companies

Cosden Petroleum Corp. (Big Spring, Tex.)—53%-owned by W. R. Grace & Co.—is reorganizing its Refining Division, renaming it the Refining & Chemical Division. Senior Vice-President Dan Krausse explains that "increased emphasis on chemicals and plastics" requires establishment of a Chemical Dept. within the division "with functional responsibility for manufacturing, marketing and product development."

Dodge & Olcott, 162-year-old producer and distributor of essential oils and aromatic chemicals, is moving into new office and laboratory quarters at 75 Ninth Ave., New York.

Cowles Chemical Co. (Cleveland) has filed with the Securities & Exchange Commission for a public offering of $2.5 million worth of convertible subordinated debentures due Dec. 31, 1980. Proposed use of proceeds: $1.7 million for construction of a new plant at Joliet, Ill.; $375,000 for expansion of the main plant at Skaneateles Falls, N.Y.; and $320,000 for retirement of an unsecured bank loan. Cowles recently acquired the Promat Division of Poor & Co. (*CW, Aug. 27, p. 40*).

Radiation Applications (Long Island City, N.Y.) is now 36% owned by Schenley Industries (New York), Schenley having added 18,183 shares to its holding last week. Hayden, Stone & Co. purchased 12,122 shares, and Payson and Trask has a 6% interest. The company specializes in development of plastic and chemical materials for the electronics and missile industries.

expansion

Fatty Epoxides: Swift & Co. (Chicago) is expanding its Technical Products Dept. plant at Hammond, Ind., to increase capacity for high-oxirane epoxidized oils and fatty esters by 8 million lbs./year. The new unit—under construction adjacent to existing facilities for propane processing and esterification—is to go onstream early in '61.

Sodium Sulfate: West End Chemical Co., division of Stauffer Chemical Co. (New York), is building its third sodium sulfate production unit at Westend, Calif. The new unit—slated onstream by next summer—will boost the company's capacity to 200,000 tons/year. Divisional President G. C. Ellis said the expansion is based on currently growing demand and anticipated further market growth (*CW, Nov. 5, p. 97*).

High-Temperature Polymers: Borane Chemical Corp.—newly formed, 51%-owned subsidiary of Lasco Industries (Montebello, Calif.)—is building a plant and laboratory to produce up to 2 million lbs./year of specialty polymers and intermediates, including polycondensates to meet high-temperature requirements of industry and space technology. First product: a new anticorrosion coating.

Liquefied Hydrocarbons: Northern Gas Products Co. (Omaha, Neb.) has awarded a $10-million contract to Fluor Corp. (Los Angeles) for engineering and construction of its low-temperature process LPG extraction plant at Bushton, Kan. (*CW, Dec. 3, p. 22*).

foreign

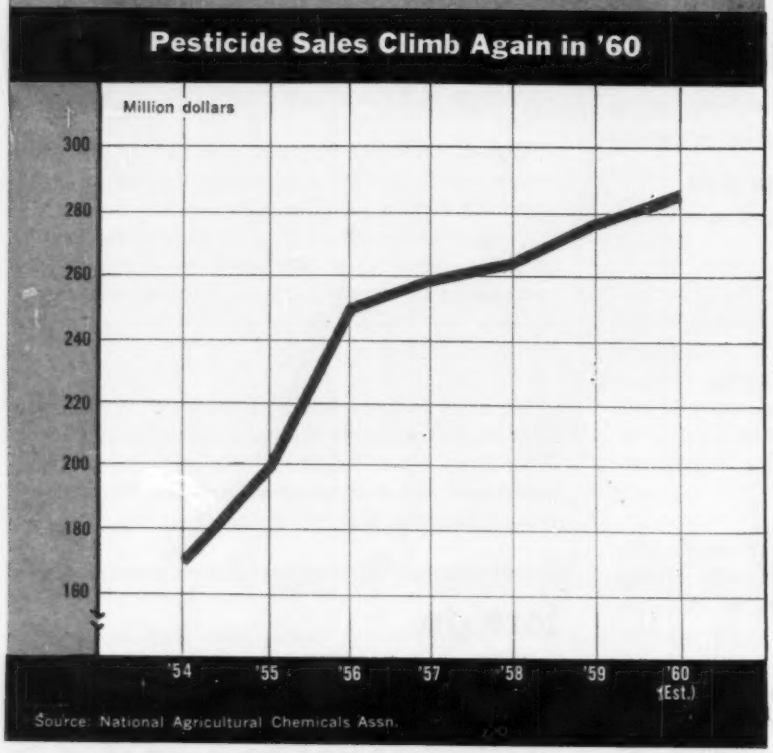
Maleic Anhydride/Belgium: Societe Chimique de Selzaete (Brussels) is building a 5,000-metric tons/year maleic anhydride plant at Selzaete, using Scientific Design's process. The unit is due onstream early in '62.

Sulfuric Acid/Egypt: The Egyptian company Societe Financiere et Industrielle d'Egypte has signed Simon-Carves Ltd. (Stockport, England) to build a 150-tons/-day sulfuric acid plant at Kafr el-Zayat. It's the first time a British firm has won a contract in the United Arab Republic since the '56 Suez crises.

Sales/West Germany: Farbenfabriken Bayer expects '60 sales to reach about $670 million, compared with $585.7 million in '59. About half will be in exports, compared with 43% last year. And Badische Anilin- & Soda-Fabrik anticipates a sales rise from '59's $540 million to more than $600 million, with exports holding their 38% share of production.

Polyvinyl Chloride/United Kingdom: Despite the U.K.'s slackening plastic sales, a major expansion in polyvinyl chloride production is planned by British Geon, which is 55% owned by Distillers Co. Ltd., 45% by B. F. Goodrich Chemical. The $4.6-million expansion at its Barry, South Wales, unit is due onstream by mid-'61, will boost Geon's PVC output to 38,000 tons/year, second in Britain only to Imperial Chemical Industries.

Sales/Europe: As part of a program to strengthen its market development program in Europe, Sterling Drug has consolidated its five subsidiaries in the United Kingdom into one organization. Winthrop Group Ltd. Marketing will be tied in with Sterling's recently organized subsidiaries on the Continent.



Pesticides: Fast Pace for '61

Sales of pesticides are expected to hit an estimated $285 million (at the basic manufacturers' level) this year, an increase of 3%, or $7 million over '59 sales, according to the National Agricultural Chemicals Assn.'s year-end report. The '61 outlook: additional gains.

Some ups and downs were experienced in different pesticide categories due to variations in the weather and the severity of pest infestations. Insecticide sales for example, are off somewhat in '60, while the generally wet, cool season helped to lift sales of fungicides and herbicides.

Herbicide sales were reported up 7% over '59, with an outlook for continued strong growth in this area during the next few years. Reason: the wider use of these products to control specific weeds, brushes and grasses. Rising labor costs for control of these types of plants along roadsides, in recreation areas, on lawns and in public parks, as well as in agricultural work, has promoted the use of herbicides.

Exports Hold Up: The foreign market continues to be a large outlet for U. S.-made pesticides. Value of pesticide exports in the first half of '60 totaled $47 million. This compares with $86 million worth of exports during the full year '59.

DDT made up more than 50% of U.S. pesticide exports. Much of this material went into the overseas malaria eradication programs. Large amounts of fungicides, fumigants, herbicides and other insecticides were also exported during the first half of the year.

Profit Squeeze: While the pesticides sales curve moves upward, profit margins have been narrowing. Besides the higher costs of labor, raw materials and distribution, the agricultural chemical firm is faced with sharply rising expenses for research and development.

Not only is the discovery of new products becoming more expensive; expenditures for product testing to meet the ever increasing requirements for government approvals are also on the rise (*see p. 41*).

Usually more than one federal agency and several state authorities must approve a new product before it can be sold. The amount and detail of research data required to obtain these various government approvals have been increasing each year.

Various companies report that it now costs between $1-1.5 million to research and test a new product and put it on the market. This does not include the additional expenses of advertising and distribution.

Net result: curtailment or even complete liquidation of research activities in some firms. Those manufacturers that have continued or expanded their research programs have tended to concentrate on products and the use areas which offer major sales potentials.

In addition, the wider use of pesticides has been accompanied by demands from nonscientific public bodies that want additional research on the pesticide industry's products. During '60, a broader effort was made to inform the public on how thoroughly pesticides are now tested, and the adequacy of public protection against possible misuse of these products.

To maintain profitability in the face of narrowing profit margins, efforts are now under way to improve the effectiveness of marketing operations. During '60, a survey disclosed that most farmers (largest single outlet for pesticides) failed to use pesticides in the optimum amount, due to lack of application equipment know-how. Closing the farmers' "knowledge gap" opens the opportunity for a broad expansion of sales in '61—to people who are already the industry's best customers.

One moderating influence in '61 may result from the federal government's attempt to drastically reduce farm surpluses, either by taking land out of production, or limiting off-farm sales. Effect of such a program cannot be predicted, however.

Outlook: By '75, pesticide sales may well total $1 billion, according to Jackson V. Vernon, vice-president of Food Machinery and Chemical Corp. and former president of National Agricultural Chemicals Assn.

Growing population; the concomitant push for more efficient food and fiber production both in the U.S. and abroad; the increasingly diminishing supply of farm manpower; the current loss of $13-15 billion/year in crops, due to pests; and the trend toward creating a "pest-free" outdoors—all will continue to boost pesticide usage.

Show Biz Builds the Image

June Allyson, Eddie Albert help Du Pont and Kaiser.

The idea of coupling the prestige value of well-known people with corporate public relations and promotion programs may be getting new emphasis from chemical process companies. That's the view one well-known entertainer—Chester H. Lauck, "Lum" of the famed radio series of "Lum and Abner"—expressed last week, and his thesis is borne out in interviews with other corporation promotion experts.

Lauck, now executive assistant to Continental Oil Co. President L. F. McCollum, spends full time on the road regaling audiences with his rural Midwest humor and commenting on the benefits of free enterprise (with special emphasis on the views of the oil industry). Last week, for example, he appeared in New York's Chemists' Club at a dinner meeting for members of the Chemical Industries Assn. and their wives.

New Emphasis: Lauck says he knows of several companies that are looking for men like himself to do public relations work. And chemical process companies indicate renewed interest in the approach, which is by no means a new technique. Last August, for example, Kaiser Industries, parent of Kaiser Aluminum & Chemical Corp., appointed stage, screen, TV star Eddie Albert vice-president for special projects. Among other things, Albert advises the company on its two national television shows, and is taking part in planning an education-by-video program Kaiser is contemplating in Hawaii.

The celebrity practice may be shifting in its focus. Not many years ago well-known public figures often were tied in with direct advertising programs, usually in testimonials of company products. Now, says management, public figures appear more frequently in the less-commercial roles.

At Union Oil Co., for example, Bill Thompson—who used to play "Old Timer" on the "Fibber McGee & Molly" program—is the company's manager of public service. He will appear before any group that will guarantee an audience of at least 100. His services are free, and his talks run the gamut of public service talks, mainly

Continental Oil's Chet Lauck (Lum and Abner's Lum) flavors economics pitch with rural humor.

CW PHOTO—WILLIAM ROSENBLUTH

aimed toward juvenile audiences.

Until last March, Union also employed Elroy "Crazylegs" Hirsch, former Los Angeles Rams end, to organize youth sport clubs in the firm's marketing area.

Specialists: National renown is not a necessity in such programs. Many of the celebrities are well known within limited circles. Many tire companies use top-notch race drivers—e.g., Goodyear employs Mickey Thompson (who has driven a car at 406 mph.) for spot appearances in key marketing drives; and for Firestone Tire, Peter DePaolo, first man to go 100 mph. in a racing car, lectures high school audiences, driver training classes and Firestone-sponsored 4-H auto care groups on driver safety. Several companies have executives considered to be outstanding speakers, who are regularly called on for appearances.

Other performers are in more direct promotion. Du Pont, for instance, calls on movie idol June Allyson, who stars in the company's Du Pont Show, to appear at fashion shows or other marketing functions. Olin Mathieson's Winchester Arms Division and Du Pont's Remington Arms Co. have both at one time hired well-known shooters to appear at county fairs and exhibitions to demonstrate their prowess with company products. These programs have been discontinued, however, because of their high cost.

Cost: Cost, of course, is a major factor in mobilizing such a program. Chet Lauck makes about 200 speeches a year in all sections of the U. S., chalks up an expense account in the neighborhood of $20,000. Reliable estimates indicate that expenses of sending shooting experts to various fairs and exhibitions on a year-round basis are $25-30,000. These expenses of course, are exclusive of salaries. To get well-known people, such as Lauck or Albert, probably costs a firm between $65,000 and $150,000 in salaries, depending on the person's fame.

In addition to being expensive, celebrity programs raise other problems.

Scheduling is a major one, usually being done by the celebrity's own staff, and often more than a year in advance. Lauck has traveled 136,000 miles this year, sometimes finds himself virtually commuting from one coast to the other.

Other performers must meet specific meeting dates of societies of importance in their company's fields, have to tailor other scheduling accordingly. In addition, there may be a prestige loss when a speaker must turn down a date because an audience can't be guaranteed, or when it does not constitute a market for the company's products or ideas.

But as company diversification continues toward consumer markets, and as companies intensify their public-image programs, look for modest increases in the employment of celebrities to augment established programs. Increases will be largely where there is a definite consumer interest in either the company's products or its philosophy.

First for Cuban Relief

Petrochemical producer Texaco, Inc., is pacesetting industry action in a new campaign to aid refugees from Cuba. Texaco has made the first major corporate contribution — $100,000 — toward the Cubans' relief. The money will be divided among the Spanish Center and other Miami, Fla., organizations, and the International Rescue Committee.

Tracy Voorhees, career government official recently named coordinator of aid for Cuban refugees by President Eisenhower, said Texaco's gift is an indication that private firms would back his plea for similar help.

Last June Texaco lost $55 million in assets that were seized by Castro's Cuban government.

LABOR

Oil Bargaining: Oil, Chemical & Atomic Workers Union has declared next week (Dec. 19-23) Collective Bargaining Week in the oil industry. Union President O. A. Knight has called on OCAW oil locals to simultaneously arrange negotiating sessions during the week on every OCAW oil contract. "We want every oil company at the bargaining table at one time," Knight says. "We want them to know that oil workers are united behind this drive for an 18¢/hour general wage increase." The union considers current offers of 5% (about 14.5¢/hour) by oil companies as unsatisfactory, mainly because the offer is tied to a two-year contract without a wage reopening clause.

ASSOCIATIONS

Carl A. Gerstacker to president, **Chester M. Brown** and **Arthur P. Kroeger** to vice-presidents; **Robert L. Bateman** to treasurer, and **Louis F. Loutrel, Jr.,** and **Carl S. Oldach** to board of governors; Synthetic Organic Chemical Manufacturers Assn. (SOCMA) (New York).

KEY CHANGES

Robert W. Johnson, Jr. to president, parent company, **D. D. Quillian** to vice-president, Chicopee Manufacturing Co., subsidiary, Johnson & Johnson (New Brunswick, N.J.).

David J. Fitzgibbons to board of directors, Sterling Drug Co. (New York).

Robert W. Dowling, Walter Hoving, William L. Russell to board of directors, Chemway Corp. (Wayne, N.J.).

Neal M. Draper to vice-president, National Aniline Division, Allied Chemical Corp. (New York).

Walter A. Smith to executive vice-president, Formica Corp., subsidiary, American Cyanamid Co. (New York).

R. C. Woerner to vice-president, Petro-Tex Chemical Corp. (Houston).

Robert D. Frey to vice-president and manager, Midwestern division, Puritan Chemical Co. (Atlanta).

Rudolph Cubicciotti to administrative vice-president, Witco Chemical Co., Inc. (New York).

G. R. Milne to president, **B. R. Krashin** to vice-president, marketing, **R. T. Lund** to vice-president, operations, **R. A. Speck** to vice-president, distribution, **J. M. Tinnon** to vice-president, engineering, Air Reduction Chemical and Carbide Co., newly formed division, Air Reduction Co., Inc. (New York).

Hugh D. Jordan, H. A. Raymond, Jr., Allie E. Salls, Conrad T. Waldie, Jr., and **J. J. McDonald** to vice-presidents, Brown Co. (Berlin, N.H.).

John K. McKinley to general manager, Petrochemical Dept., Texaco, Inc.

Welder at Saffran Engineering finishes spacers on titanium heater coil headed for chemical service.

Titanium Equipment Costs Tumble

The figure framed in the glowing helix (above) is a skilled welder. He is reaching deep into his bag of tricks to cut fabricating costs while putting the finishing touches on a titanium heater coil. One of 45 coils now being fabricated by Saffran Engineering Co. (East St. Clair Shores, Mich.) for chemical service, it's a part of the best-documented example to date of titanium's finally coming of age as a construction material for equipment.

As the cost data on heater coils show (*see table, p. 30*), titanium is now successfully bidding against other metals for special jobs. Plant management no longer has to base its justification of the use of titanium solely on the metal's promises to increase equipment life. In the past, the promises have most often been titanium's Achilles' heel because of the difficulty of trying to balance the intangible of equipment life against cold, hard cost.

But today the chemical industry's usage represents about 1.5% of titanium's 10-million-lbs./year volume —compared with less than 1% in '57. Although uses of the metal are mainly military, demand for it is about 25% above last year's.

Coming of Age: Saffran Engineering's heater-coil job—being made for National Lead—is Saffran's first for the chemical industry. The firm has been specializing in prototypes and pilot runs of aircraft engine components—working with various high-temperature alloys, the Hastelloys, stainless steels and titanium.

Ingenuity in working with aircraft engine components helped Saffran keep fabricating costs down—a far cry from the chemical industry's position in '57 when it had to accept fabricators' lack of familiarity with the metal (*CW, April 13, '57, p. 27*). Yet even today some unfamiliarity exists, which results in a wide range of bids by fabricators on the same job.

Case in point: the heater coils, which are being made for sulfuric acid-metallic sulfate service at National Lead's Sayreville, N.J., and St. Louis, Mo., plants. National Lead asked six firms to bid on construction of five coils, received bids ranging from $363 to about $2,000/coil. Evaluation of weld samples from the bidders showed that the low bidder was not sufficiently familiar with titanium to do a satisfactory job. (Some fabricators bid high, then suggest using another, more easily worked material of construction.)

Welding Technique: Inert-gas protection is still required for welding operations, to prevent oxygen and nitrogen pickup from the atmosphere, which would cause metal embrittlement. Because of length of the tubing for National's job (120 ft. long before it is coiled), welding couldn't be done in inert-gas chambers.

Saffran, as other fabricators have done, has modified a standard Heliarc welding gun. Its technique: a canister, packed with copper turnings, is taped around the head of the welding gun. Argon fed into the canister is dif-

fused over the weld zone by the copper turnings.

But inert-gas backup protection for the underside of the welds is needed, too. Saffran attached a bronze-head diffuser with small holes near the end to a ½-in.-diameter argon line to concentrate the argon at the heat-affected zone (the only place where the protection is needed).

Using this method of inerting, Saffran tack-welds the lengths of tubing together—an unorthodox procedure that can be effective when the inert-gas blanket is adequate. A canister, open on the top side, is then positioned around the tack welds. The canister acts as a wind baffle during final welding. And, because the argon is heavier than air, it accumulates in the bottom of the canister to improve the inert-gas backup during welding.

Other Costs, Too: Besides improved welding techniques there are other factors helping to make titanium a more attractively priced metal for equipment construction. Titanium-sponge prices—$2.75/lb. at the beginning of '57, $2.25/lb. at the end of '57—are now $1.60/lb.

And Titanium Metals Corp. of America's composite price index (for sheet, strip, bar, billet), which was $10.55/lb. in '57, is now down to $6.97/lb. This is a good indication that the major problems of mill product suppliers (high development costs, special forming techniques, nonintegration of mills) are now behind them.

The suppliers of mill products are also winning customers by a mature approach to selling. Early comparisons were often made with stainless steel, and selling was pitched to extending service life of equipment. But titanium suppliers, unable to compete with stainless steel on a cost basis, began going after the jobs they thought could best be done by titanium.

This usually takes them away from direct competition with stainless steel —and sometimes away from the initial sales pitch of better corrosion protection. For example, National Lead's decision to use titanium for heater coils was not based on coil corrosion. Rather, in the sulfuric acid-metallic sulfate environment, corrosion products (sulfates) built up on the coils, cut the heat transfer rate.

Titanium coils shed the corrosion products when the tanks are boiled out, require no scraping, chipping or brushing. The coils' resistance to sulfate buildup permits a cutback from 125-psi. steam to 30-psi. steam.

Although the original coil material used was not identified, it was probably lead (on the basis of its weight and scrap trade-in value—*see table, below*), and copper (on the basis of its better heat-transfer rate). This metal combination lasted only nine months, when the sulfate buildup reached the point where it couldn't be readily cleaned off.

Of the other materials considered, Hastelloy C's material cost was considered comparable. And titanium's corrosion resistance was considered better than either Hastelloy C or Type 329 stainless steel. (Although titanium is attacked by sulfuric acid, inhibitors such as chromic and nitric acid and metallic sulfates that were present prevented attack.) a prototype titanium coil has been in service for three years without showing any signs of deterioration.

In '57, when the prototype was installed, a payout time of 2.9 years was established. Now, the payout time is 1.3 years as a result of cost reductions in titanium and its fabrication. It's a good sign that titanium is finally coming into its own for process applications.

How Titanium Heater Coils Compete on Cost

	Previous material *	Titanium basis: equal heat-exchange area	Titanium basis: actual job; equal tube size
Tube size	2 in.	1½ in.	2 in.
Coil size	31½x37 in.	31½x48½ in.	38x38½ in.
Heat-exchange area	39 sq. ft.	39 sq. ft.	52 sq. ft.
Weight	1,300 lbs.	53 lbs.	74 lbs.
Material cost	$350	$740	$992.60
Fabrication cost	$650	$400 (est.)	$464
Total cost	$1,111, including $111 scrap value of trade-in	$1,140 (est.)	$1,456.60, including X rays
Estimated life	9 months	Over 3 years	Over 3 years

* Material not revealed, but probably lead-lined copper.

Sighting on Pressure

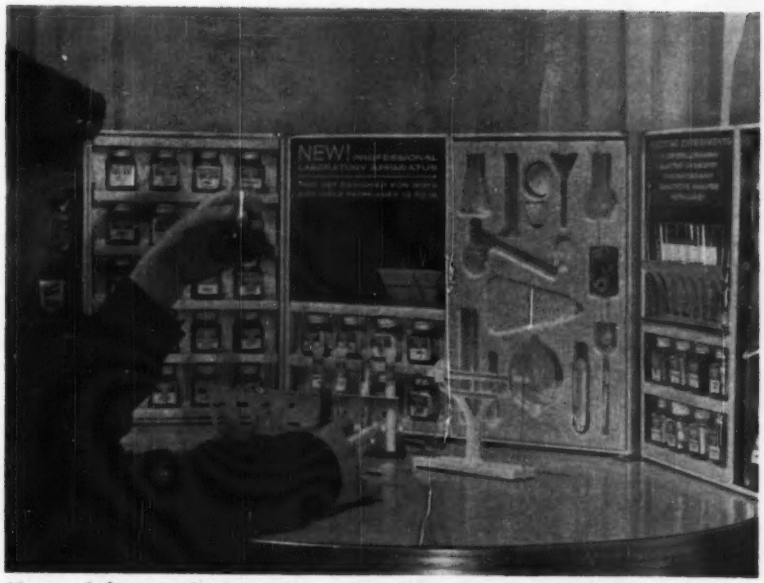
After two years of testing under plant conditions, PresSure Products Co. (Charleston, W. Va.) reported commercial production last week of a new sight glass for pressure vessel use. The glass will safely withstand ultrahigh vacuum and pressure up to 30,000 psi.

Its patented lens assembly and lens mounting prevents blow-out even if the lens has been fractured. PresSure Products licensed the patents from inventor Gene LeRoy in '57.

LeRoy began working on the glass in the '40s. Since eliminating or minimizing the tensile stress in glass would permit the lens to be used under severe conditions without fracture, he developed a mounting that holds the lens at top and bottom with non-extrudable, cushioning gaskets of compressed asbestos sheet. The gasket is surrounded with packing (asbestos-Teflon is usually specified) for maximum sealing. The lens, gasket and packing are seated in a flanged metal body fitted with a metal compression ring. When adjusting screws in the ring are tightened, the ring compresses the packing, keeping the compressed lens surrounded with resilient material.

The lens is made of two Herculite (Pittsburgh Plate Glass) tempered glass discs and one shielding disc of Pyrex (Corning Glass Works) or other special glass. The triple glass layer is chemically bonded.

The device is mounted at the factory, shipped as a unit that can be bolted onto the vessel without danger of placing the lens under tension. Mountings vary, depending on the pressure, temperature and other service conditions.



More elaborate kits, priced up to $40, are vocational aids.

Chemistry Kits: No Kid Stuff

Christmas sales of chemistry sets for 400,000 or so U.S. children this year will ring up $5-7 million for three companies making the sets.

Toy chemistry kits are not new—they've been around for about 45 years (*CW, Sept. 3, '55, p. 59*)—but this year there's a difference both in the market for the sets and the attitudes of the people giving them. In the past, the set manufacturers pegged the upper age level of the potential users in the low teens. Now they're creating sets that sell for a hefty $35-40 for youngsters in the mid-teens or older.

These sets, attuned to more sophisticated needs, reflect manufacturers' awareness that the bumper World War II baby crop is growing up. It's not possible to devise kits for very young children. Youngsters below the age of eight or nine are as likely to turn the contents of a set into a between-meals snack as to use it for its intended purpose.

Makers also attribute demand for advanced sets to interest in the U.S.'s missile race with Russia, but demand for sets of all types has benefited from this. Also helping increase sales: parents are more confident of the safety of the sets. Of the kits purchased by adults (87% of the market total) 83% are bought by women.

And the market has broadened in another way too. Girls, once considered a minuscule market for chemistry sets, now get about 20% of the kits sold. One company has a special set beamed at this growing market.

Christmas Special: While Christmas is still the top sales period for chemistry sets (70-80% are sold then), even this is changing. Accounting for increased nonseasonal sales are people in home study courses and in school districts, mainly in the South, which do not have chemistry laboratories. These groups are likely to buy the higher-priced sets ($25-40). For this they get outfits with experiments in chromatography and with tips on testing of soil and fabrics, and which also have atomic molecular models for illustrating molecular structure.

Cheaper sets ($3-7), which contain about six chemicals, still rely on "spectaculars"—invisible ink, chemical snow, etc., to interest the younger enthusiasts.

The top-selling kits (the $10 range) are growing more sophisticated yearly, now contain about 20 chemicals, heat-resistant lab ware, alcohol burners and the molecular model-building sets, litmus paper, and a beam scale.

Uncrowded Field: Three companies make the large majority of the sets sold in the U.S. (in order of size): A. C. Gilbert (New Haven, Conn.); Porter Chemical (Hagerstown, Md.); and Skil-Craft (Chicago). Porter was first in the field, got into the business around 1915. Gilbert came in soon afterward; Skil-Craft, six years ago.

Although most of the chemicals in the sets come in only ½- or 1-oz. quantities, the total amount of chemicals used by kit makers is surprisingly high. A. C. Gilbert alone buys about 350,000 lbs. of chemicals each year. Ammonium sulfate accounts for the largest poundage; sodium iodide for the least.

Gilbert, like the others, buys from distributors. It gets chemicals from Phillips Brothers Chemicals (Portland, Conn.), which supplies Gilbert with products of the major U.S. and foreign companies. Boosting usage, too, is the sale of chemical "refills," which are called for in the early months after Christmas when the kids are busy trying to produce the big boom, smell or smoke.

While most chemistry sets sold this year will end up—as do many toys—gathering dust in closets, many of them will have been good enough mental catalysts to produce a long-lasting interest in chemistry.

Tailpipe Ceramics

Sears, Roebuck's recent marketing of ceramic-coated auto exhaust mufflers and tail pipes (at $12-18), coupled with American Motors Corp.'s use of a "lifetime" muffler for its '61 models, opens a new market for ceramic frits. The new exhaust systems are now using frits at a $1.5-million/-year pace, while binders, acid-treatment chemicals and other metal-finishing materials are also getting a boost.

The current market pace, keyed to AMC's sales, could accelerate even more if the other auto companies do the expected and follow AMC's suit: about 7-8 million mufflers and tail pipes would be needed in the new-car market alone. And also likely to be tapped soon: the market for coating the 25 million mufflers and tail pipes replaced each year.

AMC's ceramic-coated exhaust sys-

tem was developed by muffler-maker Walker Manufacturing Co. (Racine, Wis.) and coatings-applier Bettinger Corp. (Toledo, O.), which treats it. Ferro Corp. supplies the frits: each muffler requires about 16¢ worth; a tail pipe, 8-9¢ worth.

Currently, Bettinger is processing 2,500 mufflers and 2,500 tail pipes daily. The units are first annealed to burn off oils and contaminants (as well as to relieve strains in the metal. Then a pickling operation cleans, acid-etches and deposits nickel to improve the coating-to-metal bond. (Acid treatments include an 18% hydrochloric bath and a 1% nitric and hydrofluoric bath at 180 F.)

Next the mufflers are automatically dipped in a tank of ceramic slurry (frit), then drained by hand. After a trip through a rotary dryer, the vertically hung mufflers are carried to a furnace for firing at 1500 F. The finished mufflers are mottled blue, a color produced by the 0.003-in. ceramic coating. The coating adds 0.7 lbs. to the weight of mufflers (and about $1.50 to AMC's costs) and 0.4 lb. to tail pipes.

Since ceramic coating is not patentable, Bettinger isn't disclosing its coating formulation. Currently, the company has a 20-year agreement with Walker covering work in the automotive field. Walker's agreement with American Motors involves exclusive rights for the current year only. Consequently, chances are good that other auto makers will soon take on the durable mufflers.

PRODUCTS

Rust Remover: Turco Products (Wilmington, Calif) has developed a non-acid rust remover that eliminates heavy rust and paint deposits such as red oxide primer in a one-tank operation. It's called Alkaline Rust Remover, contains no cyanide compounds, requires no after-neutralization.

•

Foam Catalyst: A stabilized stannous octoate catalyst for urethane foams, said to minimize loss of catalytic activity when exposed to air, is being offered by Witco Chemical (New York) under the tradename Fomrez C-2.

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White Sealant: A white, tintable, Thiokol-rubber-based sealant for construction has been developed by International Epoxy Corp. (501 Northeast 33rd St., Fort Lauderdale, Fla.). It's called E-Bond 1008, meets ASTM Specification A-116.1-1960 and comes either as a two-part system or in frozen ready-to-use cartridges.

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Algaecides: Ansul Chemical Co. (Marinette, Wis.) has two new algaecides, both of which also act as aquatic herbicides. They're tagged Ansar 354 and Ansar 201. Ansar 354 inhibits chlorella at concentration of 0.5 parts per million; at concentration of 0.01 ppm., it inhibits Square-D and black algae. Ansar 201 inhibits chlorella at concentration of 0.5 ppm.

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Mold Release Agents: Two mold release agents—Poro-Coat, designed for release of polyurethane foam, and Mono-Coat, for use with polyester and epoxy—have been developed by Chem-Trend (4880 U.S. 23, Brighton, Mich.). Poro-Coat is a colorless and odorless nonsilicone material, can be sprayed or brushed on molds. Mono-Coat is a white fluid dispersion that can be used on molds of aluminum, steel and epoxy.

•

Safety Solvent: A multipurpose safety solvent, Spray White E, is being marketed by Kelite Corp. (81 Industrial Rd., Berkeley Heights, N.J.). It's water-dilutable, is intended for maintenance cleaning of aircraft interiors and exteriors, machine tools and light fixtures. As a steam cleaning composition it can be used for light- and heavy-duty applications.

•

Obliterating Fluid: Stencil-Kover, an obliterating fluid, colored to match corrugated carton board, is being packeted in a 16-oz. aerosol container by Reynolds Ink (2075 East 65th St., Cleveland, O.). It covers old stencils or stenciling errors, permits restenciling.

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Iron Oxide Pigments: Two pure iron oxide pigments—Mapico Yellow Low Opacity and Mapico Red Low Opacity—are new products of Columbian Carbon Co. (New York). The first is said to give bright shades of yellow not previously possible with pure synthetic iron oxide. Mapico Red Low Opacity produces salmon-color tints when used with white pigments. Both products are designed for application in the paint, ink and plastic industries.

•

Sterilizing Indicator: A pressure-sensitive paper tape that is blank until sterilizing temperatures of 250 F have been applied for 15 minutes, and then shows the word "sterile," is now being marketed by Professional Tape Co. (355 Burlington Rd., Riverside, Ill.). It comes in 500- or 2,160-in. rolls, sells under the tradename TSI Tape.

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Epoxy Stripper: An epoxy stripper, Isochemstrip 708, which can remove epoxy-coated surfaces in a 5-10-minute soak, is a new product of Isochem Resins Co. (221 Oak St., Providence 9, R.I.).

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Cadmium Plating Solution: Fisher Scientific (717 Forbes Ave., Pittsburgh, Pa.) is offering a high-purity cadmium fluoborate solution for plating semiconductors. Metal contaminants are kept extremely low (copper below 0.00005%, silver below 0.00003%). It's sold under Fisher's catalog No. C-576 at $6.80 pt.

•

Metal-Working Oils: Patclin Chemical (11-23 St. Casimir Ave., Yonkers, N.Y.) has developed a series of water-displacing rust preventives for use in metal-working and finishing. They're intended for application between operations such as deburring, barrel cleaning and burnishing. Patclin 404 leaves a light monomolecular film; 430, a soft nondrying film; 431, a hard waxy film.

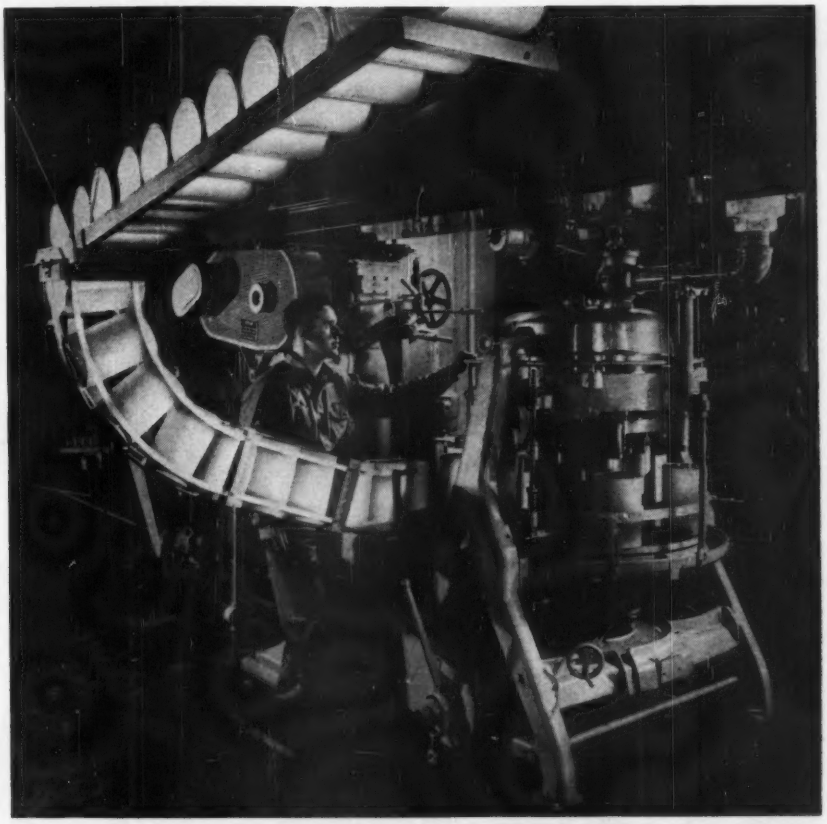
•

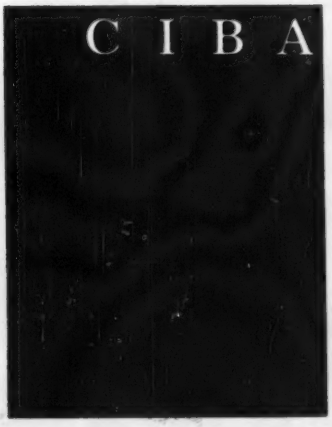
Floor-Surfacing Compounds: Two products for industrial floor surfacing, Penntrowel Latex and Color Penntrowel have been introduced by Pennsalt Chemicals Corp. (Philadelphia). The latex is a cement latex, is applied after simple cleaning and wetting of old concrete; Color Penntrowel is a chemically resistant surfacer that contains the colored resins for high color stability.

•

Epoxy Resin: Reichhold Chemicals (White Plains, N.Y.) has developed a low-viscosity, 100%-reactive liquid epoxy that is nonvolatile and almost odorless. The product, Epotuf ED-1025, has a viscosity below 1,000 cps. and a boiling point over 150 C at 5-mm. Hg absolute pressure. It's designed for electrical and coating uses.

CIBA
First in Epoxies





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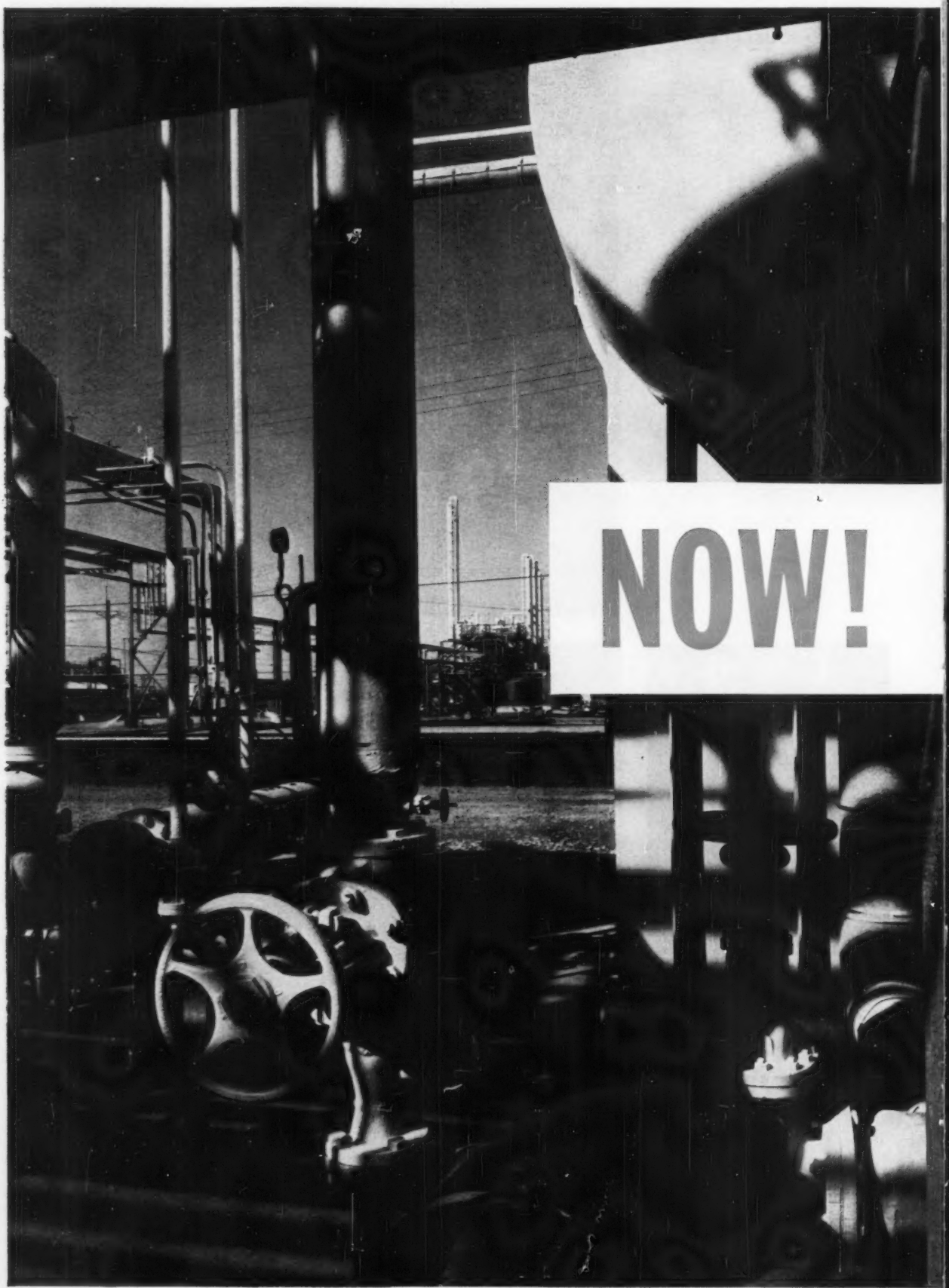
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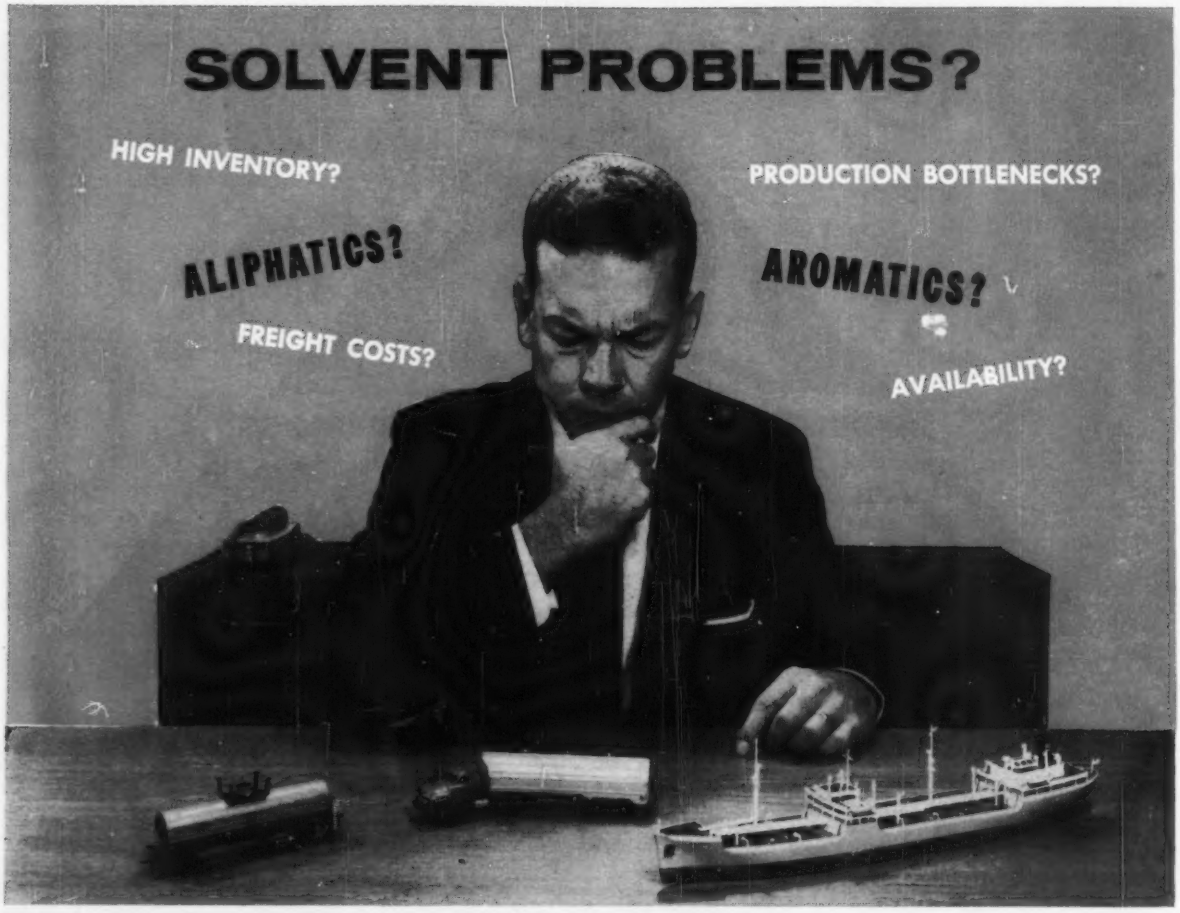

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Washington
Newsletter

CHEMICAL WEEK
December 17, 1960

Secretary of the Interior-elect Udall will favor a broader program of helium conservation than the outgoing Administration, including tapping new helium fields as well as taking it from natural gas pipelines. In the House he sponsored legislation to allow private development. Part of Udall's interest was in paving the way for development of the Pinta Dome, Ariz. helium reserve. This year's helium bill authorized construction of up to 12 helium plants.

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Makers of Red No. 1 food coloring complain that they are stuck with unused stocks of the color, including color being returned by customers for credit, while FDA is allowing unsold stocks of food products containing the color to be sold on the grounds that the dye is not an acute toxic substance. They consider the discrimination unreasonable.

Industry is also complaining that the tests imposed by the new food and color additives laws are too long and costly. At a Washington symposium, David H. Dawson, a Dupont Vice President, pegged the cost of establishing safety for a single product in the range of a half million dollars. Other food research scientists ventured the opinion that ruling out all risk in developing additives would end scientific progress in the field, discourage companies from investing in further research. General Foods Chairman Charles G. Mortimer called for a campaign to correct the "creeping notion that additives are badditives."

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New regulations for labeling drugs and promotion literature are causing some consternation in the industry. A 30-day limit for including complete information about possible hazards in promotional literature mailed to physicians may be appealed. Companies say they simply cannot get new literature printed and distributed that fast.

A ruling on the biggest problem, including complete information in package inserts without making the package too bulky, has been delayed until after Dec. 22 at least.

The new rules are strict: Inactive ingredients must be identified by quantity or proportion as well as by name. Information accompanying new drugs must be complete and substantially the same as that contained in the application to market the drug. Labeling or advertising that goes beyond claims approved in the original labeling must be re-submitted for approval. Another proviso: labels must identify the lot or control number so the manufacturing history can be traced.

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Domestic firms with foreign subsidiaries must disclose new details on their overseas operations to the Internal Revenue Service for tax purposes. However, businessmen may report the information on short forms instead of long and complicated ones.

Washington Newsletter

(Continued)

The law permits domestic companies doing business overseas to lump the taxes that all their foreign subsidiaries pay to foreign governments as a domestic tax reduction, rather than base their U.S. taxes on a country-by-country reporting of their foreign subsidiary tax payments. This means that where the domestic company's foreign subsidiary is paying more than the U.S. corporate rate of 52%, that payment will help raise the over-all average of foreign tax payments and give the U.S. company a bigger U.S. tax deduction.

Originally, the new law was intended to require the parent company to disclose minute details of its foreign subsidiaries' affairs. But domestic business spokesmen vigorously protested IRS's stringent regulations at hearings last month, claiming that the paperwork requirements alone put an almost impossible burden on them.

The amended regulations as issued take into consideration almost all of U.S. industries' objections. Itemized lists of foreign subsidiary transactions required on the proposed regulations are not required under the final regulations. Instead, the parent company may summarize briefly such items as profit and loss, sales and purchases of stock and property, commissions, rents, royalties, loans, dividends, interest, insurance premiums and fees for technical services. Transactions between U.S.-owned companies overseas need not be reported, nor banking transactions on behalf of foreign customers.

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No new "dollar gap" cures are planned by the outgoing Administration. Officials say that the steps already announced—including cutbacks in military and civilian buying and spending abroad by the Government, plus tighter ties on foreign economic aid to purchases in the U.S.—are all that are under consideration.

Some further details will be revealed shortly. Federal agencies are reporting to the President this week on steps they have taken to reduce the imbalance. The International Cooperation Administration is earmarking some $200-million aid spending for U.S. purchases (or purchases in underdeveloped nations). The Pentagon, in addition to dependent personnel cutbacks, announces that all post exchange purchases will be made in the U.S.

The Pentagon also has yet to release details on how much military spending it will try to shift back to the U.S. Just how much petroleum and products the U.S. can supply ICA and the military without prohibitive cost increases, for example, is a delicate question.

Beyond that, both ICA and the development loan fund plan to set their "ceiling" on foreign spending at about 20-25%. The fund already is under a tied loan policy, so the new ceiling won't make much difference. ICA has been spending about 60% for offshore procurement, so a 25% ceiling will represent a real turnaround.


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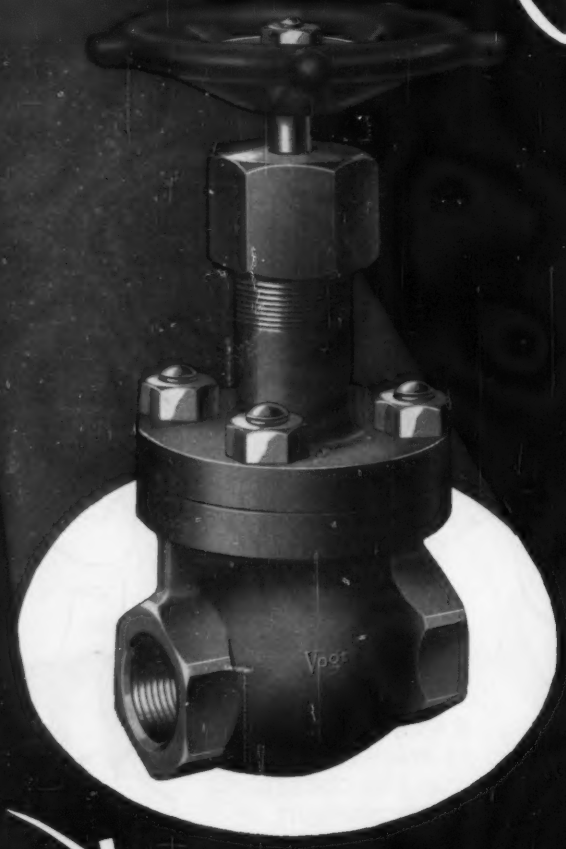

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new chemicals for industry

Here's an analysis of the industry's product development problems, plus a roundup of '60's new products

CHEMICAL WEEK's canvass of the chemical-producing industries for new products placed on the market in '60 turned up 496 items—the highest tally scored in the past five years. (Next highest turnout was 483 items in '57; the lowest was 437 in '59.)

Yet the consensus of CPI marketers is that per-company output of new products is declining slowly but steadily.

There are, of course, notable exceptions to this generalization. For example, Dow Chemical last year turned out a total of 24 new products—more than in any other year of the firm's history.

Slipping new-product output can't be attributed to any one outstanding cause—although specific market areas have special marketing problems that are obviously curtailing product development. One example: more complex testing needed to prove that new food additives conform with tighter additives laws.

One marketer, in essence, voices the majority opinion: "We have the same old problems—only more so."

Ten years ago, he observes, "it was enough to know the chemical structure of a new compound and a few basic facts about its physical properties; there was no hesitance in putting the chemical on the market in the hope that some potential consumer would find a use for it."

In the past decade the approach to chemical marketing has altered drastically. New-product planning is far more definitive, aims more at filling specific needs; emphasis is now increasingly on industry orientation rather than product orientation.

Greater emphasis on technology and applications research results from customers' "show me" demands for more detailed product information relating to their production problems. The chemical marketer must acquiesce because every new product now is forced to compete with something else—either with the same material marketed by another producer or against a different material that is aimed at the same market applications.

Lab to Market—the Pace Quickens: The long-held rule-of-thumb that new-product development can be expected to take about "seven years from test tube to tank car" now belongs to the past, so far as the more progressive firms are concerned. The span has been reduced to more like four or five years by many companies—according to Union Carbide, usually credited with the seven-year concept.

In its '60 annual report Dow Chemical states that the average time needed to move a new product from laboratory to marketplace has been cut down to four years; this compares with five years in '59 and eight years in '57.

Responsible for speeding up the development cycle: a combination of factors, including better selection of research projects, more efficient use of resources (ranging from pilot plants to computers and automatic data-handling

equipment), and improved communications in all parts of the company organizations.

There are, of course, other reasons for the faster development pace achieved by some companies. Some new products, for example, may be aimed at markets already held by older products sold by the same firm; marketing information obtained in selling older products significantly cuts labors involved in pushing the newer materials into the same end-uses. The time saving obviously helps reduce the firm's average new-product development time.

But it's also no secret that many companies have not yet been successful in shaving down the seven-year schedule; in fact some companies are still trying to reduce their development period from a 10-year average to seven years.

The general nature of a firm's product line determines to a large extent the complexity of research and development programs needed. The process of weeding out salable agricultural chemicals from a host of theoretical possibilities, for example, can be no mean task.

An agricultural chemicals expert estimates that to develop one successful new agricultural product 2,000 or so compounds must be synthesized and run through biological screening tests: laboratory work, greenhouse testing, field testing, residue analysis, toxicological studies, production planning, pilot-plant construction, patents, etc.

The cost of putting that "one-in-2,000" salable chemical on the market is estimated at about $1.5 million.

And some of the toughest problems can't be answered at the laboratory bench or in field tests—they often require highly competent managerial value judgments. Even in the initial choice of research problems, someone must try to look years ahead into the diffuse atmosphere of future marketing conditions. The goal is to balance envisioned profitability of the contemplated products against likely expenses and such intangibles as probability of consumer acceptance.

Product Mortality: It's one thing to research and develop a new product and put it on the market; it's another problem to keep it on the market and keep it profitable.

One corollary effect of more careful selection of new-product prospects from the firm's basket of ideas is that new-product market mortality may be reduced significantly. The concomitant reduction of wasted time and effort incurred in pushing poor-risk materials, to a degree at least, should help to offset high per-product development costs.

Why Many Products Fail: There are, of course, a multitude of reasons why some of any firm's new products sooner or later fail. When failure results from ultimate and unavoidable obsolescence, there is little to do except to make certain that new products are being developed fast enough to keep company earnings at high levels.

Responsibility for occasional marketing failures may, no doubt, be pinned on errors committed by specific company groups—e.g., lab research, field testing, market research, sales, etc. But when repeated failures occur, it's high time for management to take a truly critical look at its own performance.

Half Success, Half Failure: The research department of Booz-Allen & Hamilton (New York management consultant firm) recently studied the probability of commercial success of new products of diverse major industries. Taken as a whole, all U.S. industries were found to be bringing to profitable marketing only about 2.4% of all new-product ideas; of the new products that are introduced to the marketplace, almost half are commercial successes.

The chemical industry, B-A & H discovered, ran very close to the total industry average. Others, such as machinery and raw-materials processors, had a slightly better batting average, whereas consumer packaged goods and metal fabricators trailed slightly.

Although industry comparisons reveal no striking differences—all are more or less in the same efficiency range—comparisons of individual companies in each industry revealed a wholly different situation. Wide variations in product mortality show up the relative efficiencies and inefficiencies of individual company managements.

Bright Prospects—Plastics, Textiles, Automotive: Some major areas in which CPI market experts foresee continuing good opportunities for new-chemical development include plastics, textiles and automotive products.

The automotive field is considered a big market area for a diversity of new products. Foam consumption is expected to increase significantly, as is use of vinyl sheeting. Also, new chemicals will be bidding for use as hydraulic fluids and additives.

Coatings are also tabbed as important—especially water-base latexes and solventless coatings. Undoubtedly, there are many other promising areas.

Looking Ahead: Despite the problems and expense of new-product development, progressive companies have no choice but to find new products to meet mounting competitive challenges.

To do the job as efficiently as possible, management must look beyond its product-development and market-research groups. In many cases company organization must be better coordinated from top to bottom.

As some industry spokesmen candidly admit, this means that management must become more introspective about its own effectiveness and carefully resist passing the buck when a new product fails.

Improving intracompany communications is another way to boost the batting average of the commercial chemical development effort. "We are even introducing company scientists to salesmen," says one top-management man.

And long-range problems threaten the flow of new chemical products. Case in point: good scientific brains may be more difficult—and will undoubtedly be more expensive—to buy in the years ahead.

Other technology-based industries—e.g., electronics—are luring students. The challenge to the chemical executive: to make the chemical industry an attractive future for the next generation of scientists, who will be needed to man the research benches from which virtually all new products spring.

These and a host of other problems must be faced if the growth rate of the chemical process industries is to be maintained.

NEW CHEMICALS for INDUSTRY

Here are 1960's new chemicals. Each listing qualifies as: (1) a new chemical product, or (2) a new grade, or (3) a product with a new degree of availability. For addresses see Chemical Week Buyers' Guide Issue, Sept. 24, '60.

ACCURAC 24 (polyacrylamide)

M.W., high. Purity: technical; Solubility: readily in water; insoluble in common organic solvents. Chemical properties: white, free flowing powder; outstanding ability to bind pigment to fiber in papermaking process. Suggested uses: pigment retention aid (in papermaking); clarification of green liquor, clarification in save-alls. Introduced as: significantly new grade. Availability; commercial quantities. American Cyanamid, Industrial Chemical Div., Paper Chemical Dept.

ACENAPHTHENE

$C12H_{10}$. M.W., 154; M.P., 89-92 C. Purity: 95%; Solubility: in most organic solvents such as alcohols, esters, ketones, aliphatic and aromatic hydrocarbons. Suggested uses: organic intermediates, dyestuffs, pharmaceuticals. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Koppers Co., Inc., Tar Products Div.

ACETATO-ZIRCONYL CHLORIDE

$Zr(OH)_2(CH_3COO)_{1\text{-}4}Cl_{0\text{-}6}H_{20}$. M.W., 247.02; decomposes without melting. Solubility: in water, approximately 900 g/1 at saturation; slightly soluble in methanol; insoluble in acetone and acetic acid. Chemical properties: solutions are mildly acid. pH of .04 molar solution = 3.5, of 0.3 molar soln = 2.1. Suggested uses: precipitant for acid dyes; preparation of pure zirconium chemicals such as oxide by calcination; ingredient in pharmaceuticals (poison ivy lotion) and cosmetics (personal deodorants). Introduced as: new chemical product. Availability: commercial quantities. National Lead Co., Titanium Alloy Mfg. Div.

ACETO-SLIP (REFINED OLEAMIDE) (9-octadecenamide)

$C_{17}H_{33}CONH_2$; Constituents: mixture of oleamide and stearamide. M.W., 281.5; Sp.G., 0.94; M.P., 72 C; light buff color. Purity: refined. Chemical properties: easy to handle; finely divided powder. Suggested uses: slip agent for polyethylene extrusion and molding. Introduced as: significantly new grade. Availability: commercial quantities. Aceto Chemical Co., New Products Div.

p-ACETYLAMINOBENZALDEHYDE (4-acetamidobenzaldehyde)

$CHO{\cdot}C_6H_4{\cdot}NH{\cdot}COCH_3$. M.W., 163.2; M.P., 155-157 C; Color: white to off-white. Purity: 95%; Solubility: in alcohol and hot water. Chemical properties: powder. Suggested uses: as organic intermediate in the synthesis of pharmaceutical and photographic chemicals. Introduced as: new chemical product. Availability: laboratory quantities. Eastern Chemical Corp., Market Development Div.

α-ACETYLBUTYROLACTONE (2-acetyl-4-hydroxybutyric acid, lactone)

$C_6H_8O_3$. M.W., 128.12; Sp.G., 1.18-1.19; B.P., 142-44 C at 30 mm. Purity: over 90%; Solubility: 20% in water. Chemical properties: reactive intermediate for synthesis of organic compounds. Introduced as: new chemical product. Availability: commercial quantities. Winthrop Laboratories, Special Chemicals Div.

4-ACETYLRESORCINOL (2,4-dihydroxyacetophenone)

$C_8H_8O_3$. M.W., 152.15; M.P., 146-148 C; Color: lt. tan. Purity: commercial; Solubility: in ether, acetic acid, pyridine, hot ethanol; slightly soluble in water; insoluble in benzene and chloroform. Chemical properties: crystals; high absorptivity in the ultra violet light region. Suggested uses: light stabilizer for plastics; intermediate for dyes; fungicide; plant growth promoter. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals & Dyestuffs Div.

ACRYLOID A-21LV (low-viscosity acrylic ester resin)

Solids: 30% ± 0.5%; Color: colorless and clear; Solvent: 70% (Toluene 50%, Methyl ethyl ketone 40%, Butanol 10%); Viscosity (as supplied) G—J; Wt./Gal.: approx. 7.85 lbs. Chemical properties: maximum gloss and color retention properties; gives coatings with higher solids content (22-24% at spray viscosity), higher gloss before polishing, and better nitrocellulose compatibility. Suggested uses: finishes for new cars and for refinishing applications; gloss-retentive finishes for trucks, metal signs and other metal surfaces where maximum gloss and color retention properties are needed. Introduced as: new chemical product. Availability: commercial quantities. Rohm and Haas, Resinous Products Div.

ACRYLOID AT-51 (thermosetting acrylic polymer)

Solids content: 50%; Viscosity: W—Y; Solvent: (Xylol—78%), (Butanol—22%); Color (apha): 50 max.; Wt./gal.: Approx. 8.4 lbs. Chemical properties: very hard in baked films; excellent gloss and color retention; outstanding resistance to stains, detergents and solvents; wide range of compatibilities. Suggested uses: pigmented baking finishes for appliances, metal furniture, hospital equipment; clear finishes for polished metals. Introduced as: new chemical product. Availability: commercial quantities. Rohm and Haas, Resinous Products Div.

ACRYSOL 51 (acrylic polymer)

Purity: 10% solids; Solubility: in water. Chemical properties: efficient, easy to handle. Suggested uses: thickener for natural and synthetic latices. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Chemicals & Plastics Div., Textile Chemicals Dept.

"ADIPRENE" L-167 URETHANE RUBBER (urethane polymer)

Sp.G., 1.06 at 75 F. M.P., viscous liquid at room temp.; Purity: 100% solids. Chemical properties: cured by reaction with polyfunctional materials containing active hydrogen to yield hard, strong elastic products. Introduced as: product with new degree of availability. Availability: commercial quantities. Du Pont, Elastomer Chemicals Dept.

ADOQUAT (dodecylbenzene ammonium chloride)

Constituents: 20% isopropanol. M.W., 352; Sp.G., 0.94; Per Cent Active: 50. Suggested uses: in secondary oil recovery water injection systems (waterflooding) as a bactericide and corrosion inhibitor. Introduced as: new chemical product. Availability: commercial quantities. Continental Oil Co.; Petrochemical Div.

AERO CYANAMIDE (hydrogen cyanamide solution)

H_2CN_2. M.W., (H_2NCN) 42.03; Sp.G., 1.05; pH, 4.0-4.5; Fr. Pt., 12 C. Purity: approx. 23% H_2NCN in aqueous solution. Chemical properties: a more accessible source of the cyanamide ion ($NCN_=$) than calcium cyanamide, which has been the principal source. Suggested uses: starting material for the production of cyanides, guanidines, dicyandiamide and its derivatives, thiocyanates, cyanamide derivatives and other nitrogen chemicals. Introduced as: significantly new grade, product with new degree of availability. Availability: commercial quantities. American Cyanamid Co., Industrial Chemicals Div.

AERO HDS-3 DESULFURIZATION CATALYST (nickel-molybdenum)

Suggested uses: hydrogen treating of petroleum feedstocks; removal of sulfur, nitrogen & polyaromatic compounds. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Industrial Chemicals Div.

AEROCAT 3 C-12, 20 CRACKING CATALYST (alumina-silica-magnesia)

Suggested uses: fluid cracking catalyst for petroleum feedstocks. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Industrial Chemicals Div.

AEROTEX ACCELERATOR NO. 7

Constituents: mixed metallic salts. SpG., 1.28. Solubility: readily in water in all proportions. Color: water white; Per Cent Active: 30. Suggested uses: thermosetting resin catalyst; especially designed to minimize shade change of treated vat-dyed fabrics. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

AEROTEX RESIN 44 (modified triazine blend)

Sp.G., 1.13; pH, 8-9. Purity: 50% active; Solubility: readily in water in all proportions. Chemical properties: clear, free-flowing liquid. Suggested uses: for durable wrinkle recovery, minimum care, shrinkage control and low chlorine retention to cellulosic fabrics; durable mechanical finishes, improved durability of water repellent finishes. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemical Div.

AEROTEX RESIN 50 (modified urea-formaldehyde condensate)

Sp.G., 1.13; Clear, free-flowing liquid; pH, 8.5-9.5. Solubility: readily dilutable with water in all proportions; Per cent active: 50. Suggested uses: stabilization and wrinkle recovery of cellulosics, including shrinkage control of cotton knits. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

AEROTEX RESIN 161 (thermoplastic resin emulsion)

Sp.G., 1.09. Solubility: readily soluble in water in all proportions; Per cent active: 55; Color: white. Chemical properties: viscous emulsion, pH, 4.6-5.5; anionic in nature. Suggested uses: hand modification of fabrics treated with thermosetting resins; partial or complete starch replacement for building of a semi-durable body or stiffness when used alone on textile fabrics. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

AEROTEX RESIN P-220 (butylated thermosetting urea-formaldehyde resin in butyl alcohol and xylol)

Sp.G., 1.02; Color: clear. Per cent active: 60 (solids). Solubility: in xylol, butyl alcohol, mineral spirits; hydrocarbon solvent tolerance 350 min. Chemical properties: syrup. Suggested uses: component of water-in-oil printing emulsions, acting as a pigment binder and aiding in scrub resistance. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

AEROTEX RESIN DM (urea-formaldehyde resin)

Sp.G., 1.14; pH, 8.3-8.5. Solubility: readily in water in all proportions; Per cent active: 50. Chemical properties: soft, pourable paste. Suggested uses: improved shrinkage control and wash and wear on cellulosic fabrics; durable wrinkle recovery. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

AGRIMUL A-100; N-100

Solubility: in xylene. Chemical properties: nonionic content is a unique ether-linked surfactant. Suggested uses: anionic-nonionic emulsifiable blends for almost all of the chlorinated insecticide concentrates. Introduced as: new chemical product. Availability: commercial quantities. Nopco Chemical Co., Industrial Div.

ALGIMASTER

Constituents: alkyl quaternary, ammonium bromides, organic polyamine, amine hydrobromide, diethylene glycol, isopropanol, water. Suggested uses: algicide, for swimming pools. Introduced as: new chemical product. Availability: commercial quantities. Michigan Chemical Corp.

NEW CHEMICALS for INDUSTRY

ALON C
(aluminum oxide)

Al_2O_3. Sp.G., 3.3-3.6; Particle size: 20 millimicrons. Purity: 95%. Chemical properties: discrete, colloidal particles of aluminum oxide. Suggested uses: flatting agent, reinforcing agent for high-temperature elastomers; as raw material for high-purity and specialty ceramics; anti-soiling agent for natural textile fibers; coating material for electronic and fluorescent tubes; and free-flowing agent for positively charged powders. Introduced as: significantly new grade. Availability: semicommercial quantities. Cabot Corp., Minerals & Chemical Div.

ALUMINUM ACETYLACETONATE

$Al(C_5H_7O_2)_3$. M.W., 324.31; M.P., 189 C; B.P., 315 C; sulfate and iron free. Solubility: in benzene, alcohol. Suggested uses: deposition of aluminum; catalyst. Introduced as: significantly new grade. Availability: semicommercial quantities. MacKenzie Chemical Works, Inc.

ALUMINUM BORIDE

AlB_{12}. Sp.G., 2.75; Apparent bulk density (fully settled): light, .6-.8g/cc; dense, 1.2 1.4g/cc. Purity: 99.7%. Suggested uses: neutron absorption applications. Introduced as: product with new degree of availability. Availability: commercial quantities. Kawecki Chemical Co.

ALUMINUM HYDROXIDE GEL U.S.P.

$Al(OH)_3$. Purity: U.S.P. Suggested uses: antacid formulations. Introduced as: product with new degree of availability. Availability: commercial quantities. Merck & Co., Inc., Marine Magnesium Div.

AMBER BYF SERIES 50

Constituents: total nitrogen, min. 10%; amino nitrogen as % of total nitrogen (Sorenson), min. 40%. Purity: commercial. Chemical properties: dry powder; contains the water soluble B vitamins and other factors abundant in Brewers yeast. Suggested uses: stimulator of microbial growth; low cost nutrient for fermentation processes, chemical intermediate, amino acid source. Introduced as: significantly new grade. Availability: commercial quantities. Amber Laboratories, Inc.

AMBER EHC
(enzyme hydrolyzed casein, technical grade)

Constituents: total nitrogen 13.0% min.; amino nitrogen as % of total nitrogen(Sorenson) 30% min. Purity: technical grade; Solubility: in water. Chemical properties: dry powder. Suggested uses: fermentation nutrient, amino acid source, chemical intermediate, insect attractant in pesticide formulations and specialized feed ingredient. Introduced as: significantly new grade. Availability: commercial quantities. Amber Laboratories, Inc.

AMBER HSP SERIES 85
(enzyme hydrolyzed soy protein, technical grade)

Constituents: total nitrogen 8.5% min., amino nitrogen as % of total nitrogen (Sorenson) 20.0%, min. Purity: technical grade. Chemical properties: dry powder. Suggested uses: fermentation nutrient, inexpensive source of hydrolyzed protein, amino acid source, specialized feed ingredient, chemical intermediate. Introduced as: significantly new grade. Availability: commercial quantities. Amber Laboratories, Inc.

AMBIFLO LUBRICANTS
(polyalkylene glycols)

M.W., 300-3700; Sp.G., .9830-1.0548 20/20C; Flash Pt.: 425-470F; Pour Pt.: −30 to −85F. Solubility: in water; insoluble in various organic solvents, etc. Chemical properties: good stability and temperature-viscosity relationship (average VI-150); 21 different products with wide viscosities ranging from 10 to 1000 centistokes. Suggested uses: lubricants in gear and brake fluids formulations; textile fiber lubricants; component in rubber mold release and metal working formulations; heat transfer agents; antifoamers; component in cosmetic formulations. Introduced as: new chemical product. Availability: commercial quantities. Dow Chemical Co.

AMBITROL CN

Constituents: ethylene glycol base with scientifically blended inhibitor system. Sp.G., 1.1245-1.1345 at 60/60F; B.P., (IBP-DP at 760 mmHg) 275-440F; equilibrium B.P.: 325F; Reserve alkalinity: 13.0 ml. Suggested uses: freeze depressant concentrate for stationary industrial cooling systems. Introduced as: new chemical product. Availability: commercial quantities. Dow Chemical Co., Specialty Chemical Sales Div.

AMBITROL FL

Constituents: ethylene glycol, diethylene glycol, de-ionized water, inhibitor system. Sp.G., 1.0795-1.0805 at 25/25 C; B.P., (equilibrium) 229 F (min.); Fr. Pt., −40 F (max.); pH, 9.7 ± 0.2. Chemical properties: provides freeze protection for industrial cooling systems down to −40 F with protection against overheating up to 240 F engine temperature. Suggested uses: complete full-fill cooling system fluid for stationary industrial engines. Introduced as: new chemical product. Availability: commercial quantities. Dow Chemical Co., Specialty Chemical Sales Div.

AMINE 248

Constituents: principle constituent is bis-(hexamethylene) triamine and its homologues. M.W., approx. 215; Sp.G., 1.0 at 27 C.; M.P., 9-10 C; B.P., at 10 mm. Hg., 60% distills between 128-184. Solubility: miscible in water, acetone, methanol and benzene at 27-28 C. Suggested uses: ingredient in polyamide resins for adhesives; curing agent in epoxy resins; component for water treatment and corrosion inhibitor formations; absorbing medium for acid gases; oil well treating chemical. Introduced as: new chemical product. Availability: commercial quantities. Du Pont, Industrial & Biochemicals Dept. New Products Div.

p-AMINOHIPPURIC ACID
(4-aminobenzoylglycine)

$NH_2C_6H_4CONHCH_2COOH$. M.W., 194.2; M.P., 199 C; Color: white. Purity: 99/100%; Solubility: 15 g in 100 ml H_2O at 100 C; slightly soluble in alkalies and alcohol; very slightly soluble in acetone, benzene, chloroform, dioxane, ether. Chemical properties: crystalline. Suggested uses: as intermediate in organic synthesis; in biochemical work; for use in the manufacture of diagnostic clinical reagents. Introduced as: significantly new grade and product with new degree of availability. Availability: commercial quantities. Eastern Chemical Corp., Market Development Div.

1-AMINOINDANE

$C_9H_{11}N$. M.W., 133; B.P., 95-100 C at 7 mm. Solubility: in aromatic hydrocarbons. Suggested uses: specialty and pharmaceutical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Neville Chemical Co.

AMMONYX 856
(tallow dimethylbenzyl ammonium chloride)

Per cent active: 75. Suggested uses: pigment suspension in paints, suspending agent in polymer emulsions. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp., Technical Service Div.

AMMONYX 2194
(ditallow dimethyl ammonium methyl sulfate)

Per cent active: 75. Chemical properties: a substantive material imparting softening, antistatic, bacteriostatic, and rewetting properties to fabric; can be formulated into marketable products with relative ease. Suggested uses: laundry rinse additive. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp., Technical Service Div.

ANHYDROUS TETRAMETHYLETHYLENEDIAMINE (TMEDA-100%) (N,N,N',N'-tetramethylethylenediamine)

$C_6H_{16}N_2$. M.W., 116; Sp.G., 0.771/25 C; M.P., −55 C; B.P., 119-122 C; Base strength of TMEDA-100% as measured from dissociation of its conjugate acid: pK_{a1} = 8.97, pK_{a2} = 5.85; Purity: 99 + %; Solubility: completely in water. Suggested uses: catalyst for polyurethane formation, and epoxy resins; can be used as a chemical intermediate, particularly for quaternary ammonium compounds. Introduced as: new chemical product. Availability: commercial quantities. Rohm & Haas, Special Products Dept.

ARMOHIB 31

Constituents: compounded aliphatic nitrogen chemicals. Sp.G., 1.042; Per cent active: 100; Pour Pt.: 24 F; Flash Pt.: >340 F; Solubility: at use concentrations in acids. Suggested uses: acid inhibitor for sulfuric, sulfamic phosphoric and citric acid solutions. Introduced as: significantly new grade. Availability: commercial quantities. Armour Industrial Chemical Co.

ARMOFLO 48

Sp.G., 0.854 at 60 C; M.P., −4 C; Viscosity: 60 C at SSU 69.1; Solubility: in isopropanol, ethanol, neutral base oils. Chemical properties: anionic surface active agent. Suggested uses: anti-caking and anti-dusting applications. Introduced as: new chemical product. Availability: commercial quantities. Armour Industrial Chemical Co.

ARMOFLO 66; 67
(cationic surface active agent)

Sp.G., 0.826, 0.811 at 60 C; M.P., 30 C, 5C; Viscosity: 59.0, 39.8, at 60 C. Solubility: in isoproponol ethonol, neutral base oils. Suggested uses: anti-caking and anti-dusting applications. Introduced as: new chemical product. Availability: commercial quantities Armour Industrial Chemical Co.

ATRAZINE 20G

Constituents: atrazine 20%; inerts 80% (granular formulation). Chemical properties: pre-emergent herbicide. Suggested uses: weed control in corn; industrial weed control. Introduced as: significantly new grade. Availability: commercial quantities. Geigy Chemical Corp., Agricultural Chemicals Div.

ATRAZINE 80W
(2-chloro-4-ethylamino-6-isopropyl-amino-s-triazine)

Constituents: atrazine 80%; inerts 20% (wettable powder formulation). Chemical properties: pre-emergent herbicide. Suggested uses: weed control in corn; quackgrass control; industrial weed control. Introduced as: significantly new grade. Availability: commercial quantities. Geigy Chemical Corp., Agricultural Chemicals Div.

AVISUN POLYPROPYLENE

$(C_3H_6)n$. M.W., 100,000 to 500,000; Sp.G., .90—.92; M.P., 347 F. Solubility: insoluble in most. Chemical properties: outstanding chemical resistance and electrical properties. Suggested uses: fibers, films, molded applications, coatings. Introduced as: new chemical product. Availability: commercial quantities. AviSun Corp.

B-500; 1000; 1500; 2000 RESIN GRADE (polybutylene glycol)

M.W., 500; 1000; 1500; 2000 (average); Sp.G., 0.974;0.971;0.970;0.967 at 25 C; meets urethane resin grade specifications. Solubility: insoluble in water. Suggested uses: urethane coating and elastomer intermediate. Introduced as: significantly new grade. Availability: semicommercial quantities. Dow Chemical Co.

BTC 1100
(alkyl dimethyl naphthal ammonium chloride)

Per cent active: 100. Chemical properties: powdered quaternary with extremely high biocidal activity and high hard water tolerance; limited solubility of BTC 1100 in water provides more lasting bactericidal properties. Suggested uses: powdered formulations for disinfecting, sanitizing, and deodorizing. Introduced as: new chemical product. Availability: semicommercial quantities. Onyx Chemical Corp., Technical Service Div.

BAR-O-SIL
(complex barium silicate)

Sp.G., 2.7; Color: white. Purity: high. Chemical properties: fine powder; reduces plating; improves heat stability; no deleterious effect on sensitive colorants; helps control spew and produce dry, pleasing surface in vinyl products. Suggested uses: supplementary vinyl stabilizer to control plate-out in polyvinyl chloride film, sheeting, extrusions and dispersion resin systems. Introduced as: new chemical product. Availability: commercial quantities. National Lead Co.

BASIC CHROMIC CHLORIDE

$Cr_5(OH)_6Cl_9 \cdot 12H_2O$. M.W., 897.4; Sp.G., 1.70. Solubility: readily in water, methanol, ethanol and acetone. Chemical Properties: Typical sample contains 29% chromium. Suggested uses: intermediate for manufacture of chromium compounds; mordant in dyeing and printing of textiles; solvent tanning of leather. Introduced as: product with new degree of availability. Availability: commercial quantities. Diamond Alkali Co., Chromium Div.

BASIC ZIRCONYL NITRATE SOLUTION (zirconyl hydroxynitrate solution)

$ZrOOHNO_3$. M.W., 186.3; Sp.G., at 25 C approx. 1.35. Suggested uses: gelations of polyvinyl alcohol; improving lamination bonds of polyvinyl alcohol. Introduced as: new chemical product. Availability: semicommercial quantities. National Lead Co., Titanium Alloy Mfg. Div.

BATHOPHENANTHROLINE, SULFONATED, SODIUM SALT (disodium 4,7-diphenyl-1,10-phenanthrolinedisulfonate)

$C_{12}H_6N_2(C_6H_4)_2(SO_3Na)_2$. Color: light tan. Purity: analytical reagent grade. Chemical properties: free-flowing solid; red, ferrous derivative is water soluble and extraction into immiscible solvent for colorimetric comparison is avoided. Suggested uses: exceptionally sensitive colorimetric reagent for iron. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

BENZIDINE YELLOW HH 12229

Sp.G., 1.37. Purity: commercial. Chemical properties: low-oil absorption; has maximum opacity that can be obtained with Benzidine Yellow; enamels made with this pigment have a high gloss. Suggested uses: where Chrome Yellows cannot be used because of restrictions on lead and where Hansa Yellows will not stand the baking temperatures involved, i.e., toy enamels, industrial specialties and full shade yellow lead-free paints. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

BIS(CHLOROMETHYL)DURENE

$C_{12}H_{16}Cl_2$. M.W., 233.08; M.P., 198-202. Purity: 97.3%; Solubility: in aromatics; slightly soluble in paraffins, ethers. Chemical properties: highly reactive and readily undergoes oxidation, hydrolysis, reduction, etc. Suggested uses: plasticizers, fibers, films, synthetic lubricants, polyesters, resins, polymers, surface coatings. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

BIS(DICHLOROPROPYL) CHLOROMETHYL PHOSPHONATE

$ClCH_2P(O)(OCH_2CHClCH_2Cl)_2$. M.W., 352.41; B.P., 175 C at 1 mm; $h_{25}D$, 1.5059. Purity: 99+%; Solubility: in most organic solvents; insoluble in water. Chemical properties: viscous liquid. Suggested uses: in flame proofing; as plasticizer. Introduced as: new chemical product. Availability: laboratory quantities. Victor Chem. Works, Div. Stauffer Chem. Co.

BIS(HEXAMETHYLENE)TRIAMINE

$C_{12}H_{29}N_3$. M.W., 215.38; Sp.G., 1.0 at 30 C; M.P., 33-34 C; B.P., 140 C at 1 mm Hg. Solubility: very soluble in water and methanol; slightly soluble in acetone, carbon tetrachloride and benzene. Suggested uses: in polyamide resins for adhesives; controlled cross-linking of polymers; oil emulsion breakers; curing agent in epoxy resins; component for water treatment chemicals such as ion exchange resins and chelating agents. Introduced as: new chemical product. Availability: laboratory quantities. Du Pont, Industrial & Biochemicals Dept.

BIS(TETRACHLOROETHYL)DISULFIDE

$C_4H_2Cl_8S_2$. M.W., 397.84; Sp.G., 1.785 at 23.3 C; B.P., 185 C at 3 mm. Purity: 95+%; Solubility: in benzene, hexane, ethanol, CCl_4. Suggested uses: intermediate; agricultural chemicals; additives. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Hooker Chemical Corp., Product Development.

BORON FLUORIDE MONOETHYLAMINE, BF3-MEA

$BF_3 - C_2H_5NH_2$. M.W., 112.904; Sp.G., 1.38; M.P., 88-90 C; Color: white to pale tan flake. Solubility: 23% in furfuryl alcohol, 50% in Polyglycol 200; soluble in acetone, MEK. Chemical properties: releases BF_3 at temperatures above 110 C. Suggested uses: elevated temperature cure of epoxy resins. Introduced as: new chemical product. Availability: commercial quantities. The Harshaw Chemical Co., Inorganic Div.

1,2,4-BUTENETRICARBOXYLIC ACID (3 carboxyadipic acid)

$C_7H_{10}O_6$. M.P., 123 C; neutral equivalent: 63.3. Purity: 99.5 mole %; Solubility: in water, alcohols, acetone; insoluble in ether, benzene. Suggested uses: plasticizers; synthetic lubricants; alkyd resins; reinforced plastics. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

BUTON A-500

Constituents: nvm 100%. Sp.G., varnish 0.915 at 23 C. Chemical properties: all-hydrocarbon liquid thermosetting polymer consisting of a styrene-butadiene copolymer of high molecular wt. and high unsaturation. Suggested uses: printing circuit backings; radomes; electrical and industrial housings; tanks; piping and fittings; decorative materials; housewares, table tops; dishwashers; molding compounds; electrical appliances; airplanes; automobiles. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

BUTON IMPREGNATING VARNISH

Constituents: nvm 53%; toluene 47%. Sp.G., varnish 0.91 at 23 C; cured resin 1.02 at 23 C. Chemical properties: 100% reactive polymer in an inert hydrocarbon solvent. Suggested uses: high pressure laminates; prepregs for low pressure laminates; printed circuit board. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

BUTON RESIN 100

Constituents: nvm 100%. Sp.G., 0.915 at 23 C; viscosity: 0.9-1.2; Refractive Index: 1.53; Acid No.: 0. Chemical properties: new thermosetting resin and drying vehicle consisting of butadiene-styrene copolymer of low molecular wt. and high unsaturation. Suggested uses: metal finishes, coatings; furniture finishes. Introduced as: new chemical product. Availability: commercial quantities. Enjay Chemical Co., Market Development.

BUTON RESIN MD-425

Constituents: nvm 45%; solvesso 100 33%; t-butyl alcohol 22%. Sp.G., 0.915 at 23 C; Viscosity: 2.5-3.5; Refractive Index: 1.50; Acid No.: 16. Chemical properties: new thermosetting resin and drying vehicle consisting of butadiene-styrene copolymer of low molecular wt. and high unsaturation. Suggested uses: metal finishes, coatings; furniture finishes. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

BUTYL RUBBER LATEX (MD-600-DC; SS)

Constituents: total solids: 62; 54-55 wt. %; emulsifier 1.3; .7 wt. %. Sp.G., 0.95; 0.96 at 70 F; pH, 5-6. Particle size = 0.5 average; Surface tension: 20-38; 30-38 dynes/cm. at 70 F. Chemical properties: stable emulsion of butyl rubber in water. Suggested uses: adhesives; roof coatings; emulsion paints; paper, textile, leather coatings. Introduced as: new chemical product. Availablity: semicommercial quantities. Enjay Chemical Co., Market Development.

m-TERTIARY BUTYLPHENOL

$C_4H_9C_6H_4OH$. M.W., 150; Sp.G., 0.982; M.P., 23.1 C; B.P., 237-239 C. Purity: 80% meta isomer; Solubility: insoluble in water; soluble in benzene, aliphatic alcohols, carbon tetrachloride. Chemical properties: an alkyl phenol with three reactive positions; very hindered. Suggested uses: synthetic intermediate for use in self plasticized resins. Introduced as: new chemical product. Availability: laboratory quantities. Pennsalt Chemicals Corp., Research Products Dev. Dept.

BUTYRAMIDINE

$C_4H_{10}ON_2$. M.W., 106; M.P., 107-12 C; Water content: <1.5%. Purity: 98%. Suggested uses: organic intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Winthrop Laboratories, Special Chemicals Div.

n-BUTYRONITRILE

C_4H_7N. M.W., 69.1; Sp.G., 0.7919 at 20/20 C; B.P., 116-117.7 C at 760 mm.; Color: 10 ppm. APHA; Water content: 0.1%; Fr. Pt., −112 C; Flash Pt., 80 F. Purity: 99%; Solubility: miscible with acetone, benzene, carbon tetrachloride and ethanol (95%); 3.3% in water. Chemical properties: lower aliphatic nitrile undergoing reactions typical of this class including hydrolysis, dehydrogenation and reaction with aldehydes, alcohols, hydrogen halides and hydrogen sulfides. Suggested uses: basic material in synthesis of industrial, specialty, and pharmaceutical chemical products and intermediates. Introduced as: product with new degree of availability. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

CDB-59 POTASSIUM DICHLOROISOCYANURATE (potassium salt, dichlorotriazine trione)

$Cl_2K(NCO)_3$; pH, (1% sol) 6-7; Purity: 59% available chlorine; Solubility: 10g/100 ml sol, R.T. Chemical properties: stable, totally soluble, neutral in pH; available chlorine compound in two granulations: powder, all thru 200 mesh; granular, −40, +140 mesh. Suggested uses: in household bleach; scouring powder; household automatic dishwashing compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. Food Machinery and Chemical Corp., Mineral Products Div.

CDB-60 SODIUM DICHLOROISOCYANURATE (sodium salt of dichloro triazine trione)

$Cl_2Na(NCO)_3$. pH, (1% sol.) 6-7; Purity: 60% available chlorine; Solubility: 25g/100 ml sol., R.T. Chemical properties: stable, totally and very rapidly soluble, neutral in pH, available chlorine compound in two granulations: powder, all through 200 mesh, granular, −40, +140 mesh. Suggested uses: in household automatic dishwashing detergents; detergent-sanitizers; food plant and dairy sanitizers. Introduced as: product with new degree of availability. Availability: commercial quantities. Food Machinery and Chemical Corp., Mineral Products Div.

CDB-70 DICHLOROISOCYANURIC ACID (trichloro triazine trione)

$Cl_2H(NCO)_3$. pH, (1% sol.): 2.5-3.5; Purity: 76% available chlorine; Solubility: 1.5g/100 ml. sol., R.T. Chemical properties: stable, completely soluble, available chlorine compound; available in two granulations: powder, all through 200 mesh, granular, −40, +140 mesh. Suggested uses: commercial and institutional laundry bleach, scouring powder, and automatic dishwashing detergents; acid sanitizers. Introduced as: product with new degree of availability. Availability: commercial quantities. Food Machinery and Chemical Corp., Mineral Products Div.

CDB-85 TRICHLOROISOCYANURIC ACID (trichloro triazine trione)

$(ClNCO)_3$. pH, (1% sol.) 2.5-3.5; Purity: 88% available chlorine; Solubility: 1.2 g/100 ml sol., R.T. Chemical properties: stable, completely soluble, high available chlorine compound; available in two granulations: powder, all through 200 mesh, granular, −40, +140 mesh. Suggested uses: commercial and institutional laundry bleach, scouring powder, and automatic dishwashing detergents; acid sanitizers. Introduced as: product with new degree of availability. Availability: commercial quantities. Food Machinery and Chemical Corp., Mineral Products Div.

CADMIUM OXALATE

CdC_2O_4. M.W., 200.43. Solubility: insoluble in water, alcohol; soluble in acids, ammonium hydroxide. Suggested uses: reagent. Introduced as: new chemical product. Availability: laboratory quantities. City Chemical Corp.

CALMAGITE (1-hydroxy-4-methyl-2-phenylazo-2-naphthol-4-sulfonic acid)

$1\text{-}HO\text{-}4\text{-}CH_3\text{-}C_6H_3\text{-}N = N\text{-}C_{10}H_5\text{-}2OH\text{-}4\text{-}SO_3H$. Purity: suitable for indicator purposes. Suggested uses: indicator in EDTA titrations; a water soluble, permanently stable substitute for Eriochrome Black T. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

CARBOSET 511; 531

Solubility: in water. Chemical properties: acrylic plastic that cures at room temperature to form water-insoluble films (531 at moderate heat). Suggested uses: paints, polishes, protective coverings, pigment binder, binders for non-

woven fabrics, sizing compounds, adhesives. Introduced as: new chemical product. Availability: commercial quantities. B. F. Goodrich Chemical Co.

CATALYST T-9 (stannous salt)

Sp.G., 1.2 at 25 C. Purity: 96.0% min. stannous. Chemical properties: more uniform catalytic activity during the preparation of one-shot polyether urethane foams; consistently develops foam of fine, uniform cell structure; has the highest stannous content of any catalyst now available. Suggested uses: catalyst for urethanes, epoxies. Introduced as: significantly new grade. Availability: commercial quantities. Metal & Thermit Corp.

CATALYST X-10

Constituents: buffered metal salt complex; Color: white. Purity: essentially 100%; Solubility: approx. 5% in water at room temp. Chemical properties: granular powder; rapid curing catalyst, produces optimum chlorine resistant effects with thermosetting resins. Suggested uses: tends to minimize odor development on fabrics treated with thermosetting resins; provides excellent resin fixation and optimum chlorine resistance. Introduced as: new chemical product. Availability: commercial quantities. Sun Chemical Corp., Warwick Div.

CATANAC SP ANTISTATIC AGENT (dimethyl-2-hydroxyethyl-3-octadecanamidopropyl-ammonium dihydrogen phosphate)

$C_{25}H_{55}PN_2O_6$; Constituents: 35% solution in an isopropyl alcohol-water mixture. M.W., 511; Solubility: miscible with water, acetone, alcohols and other polar solvents of low molecular weight. Color: Clear yellow. Compatibility: with nonionics and other cationics in all proportions; with anionics only in specific proportions. Chemical properties: liquid; ability to prevent the accumulation of static charge on a wide variety of substances; its surface active properties make it an active detergent and one of the best emulsifying agents of the quaternary ammonium type. Suggested uses: antistatic agent for textiles, plastics, surface coatings, glass and other materials; antistatic agent and emulsifier for wax polishes; detergent; deflocculating, dispersing and settling agent; dyeing and dye stripping aid; rewetting agent; mold lubricant for plastics and resins. Introduced as: product with new degree of availability. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

CATANAC SN ANTISTATIC AGENT (dimethyl-2-hydroxyethyl-3-octadecanamidopropyl-ammonium nitrate)

$C_{25}H_{53}N_3O_5$; Constituents: 50% solution in an isopropyl alcohol-water mixture. M.W., 476; Solubility: miscible with water, acetone, alcohols and other polar solvents of low molecular weight; solutions of varying concentrations may be prepared in solvents of higher molecular weight and in nonpolar solvents by the application of heat. Color: light amber; pH, aqueous solution: 4-6. Compatibility: in all proportions with nonionics and other cationics; with anionics only in specific proportions or when the product of reaction is soluble. Chemical properties: liquid; ability to prevent the accumulation of static charge on a wide variety of substances. Suggested uses: antistatic agent for textiles, plastics, paper, surface coatings, glass and other materials. Introduced as: product with new degree of availability. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

CELLOSIZE QP-4400 (hydroxyethyl cellulose)

Chemical properties: viscosity of 2% aqueous solution at 20 C is 4,000 CPS; non-gelling in water, even at the boiling point of solutions. Suggested uses: thickener for water-based paints; emulsion polymerization; increasing wet strength, grease-proofing and sizing of paper; textile sizing; non-yellowing pigment carrier for printing pastes; cosmetic formulations. Introduced as: a new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

CELLOSIZE QP-15,000 (hydroxyethyl cellulose)

Chemical properties: viscosity of 2% aqueous solution at 20 C is 15,000 CPS; soluble in hot or cold water. Suggested uses: thickener for water-based paints; water retainer for ceramics, cement, agricultural dusts, tile grout; film forming for seed coatings, warp and finish sizes for textiles; paper coating; pesticide sprays; binder for ceramic colors and refractory uses; dispersant for wettable powders, leather dressings, pigments. Introduced as: a significantly new grade of material. Availability: commercial quantities. Union Carbide Chemicals Co.

CHEM-REZ 100 (urea furan resin)

Color: light; Viscosity: Gardner W; Per cent active: approx. 80. Chemical properties: very fast low-temp. curing bonding resin. Suggested uses: foundry sand cores, molds; bonding molded granular articles. Introduced as: new chemical product. Availability: commercial quantities. Archer-Daniels-Midland.

CHEM-REZ A-200 (furan resin)

Per cent active: 100; Viscosity: Gardner A; Color: Gardner 18. Chemical properties: complete chemical curing bonding resin for mixed aggregates. Suggested uses: foundry sand cores, molds; bonding molded granular articles. Introduced as: new chemical product. Availability: commercial quantities. Archer-Daniels-Midland.

CHLOROACETONE (1-chloro-2-propanone)

C_3H_5OCl; 90% monochloroacetone, min.; 9% dichloroacetone, max.; 1% mesityl oxide, max. M.W., 92.53; Sp.G., 1.162 at 25/25 C; B.P., 119 C (pure compound). Purity 90% min.; Solubility: in water, alcohol, ether, chloroform. Chemical properties: four reactive centers: chlorine atom, methylene, methyl hydrogens, carbonyl group. Suggested uses: manufacture of couplers for color photography; enzyme inactivator; tumor growth inhibitor; intermediate in manufacture of antioxidants, insecticides, fumigants, perfumes and flavors. Introduced as: new chemical product. Availability: commercial quantities. Benzol Products Co., Research & Development.

3-CHLORO-4 BENZAMIDO-6-METHYLANILINE

$C_{14}H_{13}ClN_2O$. M.W., 260.5; M.P., 198-9 C; Color: white. Purity: tech.; Solubility: in acids Chemical properties: solid; diazotizable amine (fastbordeaux 3B base). Suggested uses: in azoic dyes; pigments. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals & Dyestuffs Div.

CHLOROBUTYL RUBBER

M.W., 450,000; Sp.G., 0.92; Chlorine: 1.1-1.3 wt. %; Unsaturation; 1-2 mole %; Mooney Viscosity: 52±5 (8'ML/212 F). Chemical properties: modification of butyl rubber wherein a reactive allylic type of chlorine has been introduced. Suggested uses: Tire inner liners; steam hose; conveyor belts; tire veneers; food containers; molded goods; curing bladders; carcass compounds; white sidewalls; wire insulation; gaskets; mechanical goods. Introduced as: new chemical product. Availability: commercial quantities. Enjay Chemical Co., Market Development.

1-CHLORO-3,3-DIMETHYLBUTANE

$Cl{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)_3$. M.W. 121.0; B.P., 116-122 C; Color: pale straw to colorless. Purity: 98%. Chemical properties: Mobile liquid. Suggested uses: organic intermediate; synthesis of steroid compounds. Introduced as: new chemical product. Availability: laboratory quantities. Eastern Chemical Corp., Market Development Div.

CHLOROHYDROQUINONE (2-chloro-1,4-dihydroxybenzene)

Eastern Checical Corp., Market Development. C; B.P., 263 C; Color: grey. Purity: 98%. Solubility: very soluble in water, alcohol and ether; soluble in hot chloroform. Chemical properties: crystalline powder. Suggested uses: intermediate in the manufacture of organic compounds, dyestuffs, pharmaceuticals, photographic chemicals; photographic developer; bactericide. Introduced as: product with new degree of availability. Availability: commercial quantities. Eastern Chemical Corp., Market Development

CHLOROHYDROQUINONE DIPROPYL ETHER (1-chloro-2,5-di-n-propoxybenzene)

$C_{12}H_{17}O_2Cl$. M.W., 228.8; B.P., 118-120 C/1 mm.; Color: pale straw. Purity: 98%. Chemical properties: liquid. Suggested uses: organic intermediate in the synthesis of dyestuffs, pharmaceuticals, photographic chemicals, etc. Introduced as: new chemical product. Availability: laboratory quantities. Eastern Chemical Corp., Market Development Div.

CHLOROMALEIC ANHYDRIDE

C_4HO_3Cl. M.W., 150.5; Sp.G., 1.5; M.P., 10-15 C; B.P., approx. 192 C; Color: yellow. Purity: commercial. Chemical properties: liquid maleic anhydride. Suggested uses: catalyst for epoxy resins, organic intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Aceto Chemical Co., Inc., New Products Div.

CHLOROMETHYLATED DIPHENYL ETHER

Constituents: mixture of mono-, di- and trichloromethylated diphenyl ether. Solubility: in organic solvents, notably aromatics. Suggested uses: monomer for S.E. polymer; chemical intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Dow Chemical Co.

CHLOROMETHYLDURENE

$C_{11}H_{14}Cl$. M.W., 183.59; M.P., 69-71 C. Purity: 97.0 wt. %; Solubility: in paraffins, aromatics, ethers. Chemical properties: synthesis for obtaining valuable chemical intermediates. Suggested uses: resins; plasticizers; polymers. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

2-CHLORO-5-NITROBENZENE-SULFONAMIDE

Color: greyish-white; Chlorine content: 14-9, 15%. Purity: 99%; Solubility: in benzene; insoluble in water. Chemical properties: solid; reducible nitro group; reactine sulfonamide group. Suggested uses: dye and pharmaceutical intermediates. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals & Dyestuffs Div.

4-CHLOROPYRIMIDINE

$C_4H_3N_2Cl$. Purity: reagent grade. Suggested uses: interesting intermediate for Pyrimidine synthesis in cancer research program. Introduced as: new chemical product. Availability: laboratory quantities. Krishell Labs, Inc.

CHLOROTHENE NU (inhibited 1,1,1,trichloroethane) (inhibited methyl chloroform-)

CH_3CCl_3. Constituents: methyl chloroform plus inhibitors. Sp.G., 1.312-1.321 at 25/25 C; B.P., 72-88 C; Fr.Pt., −50 C; meets fed. spec. OT-620a. Suggested uses: cold degreasing of metal; solvent in formulations; aerosol vapor pressure depressant; cleaning electric motors; carrier for lubricants; extraction solvent. Introduced as: significantly new grade. Availability: commercial quantities. Dow Chemical Co.

P-CHLOROTHIOPHENOL (para-chlorobenzenethiol)

ClC_6H_4SH. M.W., 144.5; M.P., 52-55 C; B.P., 205-207 C. Purity: 97% min.; Solubility: in benzene, toluene, ethers, esters, and alcohols. Chemical properties: condensation reactions with aldehydes, ketones, secondary amines, and esters; addition reactions with olefins and other unsaturated compounds; reacts with halogens to form sulfonyl halide, with amino to form thioethers and amine salts and with nitriles to form iminothioesters. Introduced as: product with new degree of availability. Availability: commercial quantities. Stauffer Chemical Co., Market Development Dept.

CHROMOUS CHLORIDE

$CrCl_2$. M.W., 122.92; Sp.G., 2.75; M.P., 815 C; B.P., 1302 C. Purity: 96%; Solubility: very soluble in water; slightly soluble in alcohol; insoluble in ether. Chemical properties: hygroscopic; readily oxidized to Cr^{III}; reactive. Suggested uses: reducing agent; vapor plating; chromizing; intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

COBALT MONOXIDE (cobaltous oxide)

Co^{O}. M.W., 74.94; M.P., 1935 C. Solubility:

insoluble in acids; soluble in mineral acids. Suggested uses: glass decolorization; pigment, enamel and glass coloring. Introduced as: new chemical product. Availability: laboratory quantities. City Chemical Corp.

COBALT SELENATE (cobaltous selenate)

$CoSeO_4 \cdot 5H_2O$. M.W., 291.98; Sp.G., 2.512. Solubility: freely in water. Suggested uses: reagent. Introduced as: new chemical product. Availability: laboratory quantities. City Chemical Corp.

COLUMBIUM (NIOBIUM) PENTACHLORIDE

$CbCl_5$ ($NbCl_5$). M.W., 270.4; Sp.G., 2.75 (real); M.P., 203.4 C; B.P., 247.4 C; Color: yellow. Purity: 99.5%. Chemical properties: fine powder. Suggested uses: in production of metal; coating of metal particles; chemical intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Stauffer Chemical Co., Market Development Dept.

COPPER ETHYLACETOACETATE

$C_{12}H_{18}O_6Cu$. M.W., 321.80; M.P., 192-193 C; Color: blue-green. Purity: 99/100%; Solubility: insoluble in water; soluble in ether, carbon bisulfide and ethanol; completely soluble in 10 parts of boiling benzene. Chemical properties: powder. Suggested uses: research and development. Introduced as: new chemical product. Availability: semicommercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

COPPER IODATE (cupric iodate)

$Cu(IO_3)_2 \cdot H_2O$. M.W., 431.43; Sp.G., 4.872; M.P., loses water at 240 C; B.P., decomposes at 290 C. Solubility: slightly in water; soluble in dilute mineral acids and ammonium hydroxide. Suggested uses: reagent. Introduced as: new chemical product. Availability: laboratory quantities. City Chemical Corp.

CUPRIC GLYCINATE, C.P., ANHYDROUS (cupric amino acetate)

$C_4H_8O_4N_2Cu$; Cl & SO_4: 10 ppm. max.; As, Fe & Pb: 10 ppm. max. M.W., 211.66; Color: blue; Moisture: 0.5% max. Purity: 99% min.; Solubility: very slightly in water; insoluble in hydrocarbons, ethers and ketones. Chemical properties: triboluminescent crystals; ideal source of easily assimilable trace amounts of cupric ions for human or animal requirements. Suggested uses: possible use in human food and animal feeds as a catalyst for rapid assimilation of iron for hemoglobin formation; in electroplating baths. Introduced as: new chemical product. Availability: commercial quantities. Benzol Products Co., Research & Development.

CYANALUBE SOFTENER R (modified polyethylene-based softener)

Sp.G., 0.99; pH, 9-10. Solubility: dilutable with water in all proportions; Per cent active: 25. Chemical properties: nonionic opalescent emulsion. Suggested uses: imparts softness, improves abrasion resistance, tear strength and sewing qualities of resin-treated or harsh goods. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

CYANATEX SOFTENER CP (sulfosuccinate-tallow transester)

Sp.G., 0.96; Color: light tan; pH, 6.0. Solubility: disperses with stirring in water at temperatures over 120 F; Per cent active: 95. Chemical properties: paste. Suggested uses: economical, concentrated softener; aids serveability in pure or resin finishes; enhances wrinkle recovery of resin-treated fabrics with little effect on tensile strength. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

CYANATEX SOFTENER SB CONC. (sulfonated fatty ester)

Sp.G., 1.02; Color: tan; pH, 5-6. Purity: 72% active; Solubility: disperses in boiling water with mechanical agitation. Chemical properties: soft, anionic paste. Suggested uses: softness at low concentrations on cellulosic and synthetic fabrics; especially recommended as a pure finish or as a top-softener on resin-treated fabrics. Introduced as: significantly new grade. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

CYANOCEL CHEMICALLY MODIFIED CELLULOSE (cyanoethylated cellulose)

$(C_{15}H_{22}N_3O_5)_x$; Constituents: nitrogen, 12-12.6%; carboxyl, <0.1 milliequivalents/gr. Bulk density: 5-6 lb./cubic foot; Color: white; Water content: 23 C, at relative humidity of 40, 1.30%; Solubility: 5% or greater in a variety of polar organic solvents. Chemical properties: fibrous solid. Suggested uses: binder for electroluminescent pigments; film for capacitor construction. Introduced as: new chemical product. Availability: semicommercial quantities. American Cyanamid, Organic Chemicals Div.

CYASORB UV 314 LIGHT ABSORBER (2,2'-dihydroxy-4-n-octoxybenzophenone)

$C_{21}H_{26}O_4$. M.W., 342; M.P., 90.5-92.0 C; Color: pale yellow. Solubility: g./100 gms. total solution: hexane—1.8; benzene—25.5; dioctyl phthalate — 2.0; methyl ethyl ketone — 24.6. Transmission, 10 mg/liter of Toluene: absorption peak occurs at 357 millimicrons. Chemical properties: powder. Suggested uses: light stabilizer for plastics; particularly effective for polyolefins. Introduced as: product with new degree of availability. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

CYASORB UV 531 LIGHT ABSORBER (2-hydroxy-4-n-octoxybenzophenone)

$C_{21}H_{26}O_3$. M.W., 326; M.P., 48-49 C; Color: pale yellow. Solubility: g./100 g total solution: benzene—72.7; hexane—40.1; 3A alcohol—2.6; acetone—74.3; dioctyl phthalate—20.5. Transmission, 10 mg/liter of Toluene: absorption peak occurs at 325 millimicrons. Chemical properties: powder. Suggested uses: light stabilizer for plastics; particularly effective in polyolefins. Introduced as: new chemical product. Availability: semicommercial quantities. American Cyanamid, Organic Chemicals Div.

CYCLODODECATRIENE (1,5,9-cyclododecatriene)

$C_{12}H_{18}$. M.W., 162.27; Sp.G., 0.8907 at 20/4 C; M.P., −15 C; B.P., 74-100 C at 10 mm.; Refractive index: 1.5067 N 20/D; Viscosity: 4.9 cp at 20 C; Vapor pressure: 1.9 mm. at 60 C, 12 mm. at 100 C, 59 mm. at 140 C. Chemical properties: non-conjugated triene which exists in at least two isomeric forms: t, t, t and c, t, t; reacts chemically as hydrocarbon with isolated double bonds. Suggested uses: plasticizers; petroleum additives; synthetic lubricants; polymers; rubber chemicals; resins. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

CYCLOHEXANECARBOXYLIC ACID (hexahydrobenzoic acid)

M.W., 128.17; Sp.G., 1.048 at 15/4 C; M.P., 31.1 C. Purity: 99.5+%; Solubility: slightly in water; soluble in polar organic solvents. Suggested uses: intermediate for surface coatings, pharmaceuticals, insecticides, and various esters. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Chemicals Div.

1,8-CYCLOTETRADECADIYNE (cyclic polyacetylene)

$C_{14}H_{20}$. M.W., 188.3; Sp.G., 1.040 at 25 C; 0.872 at 105 C; M.P., 99-100 C; B.P., 100 C at 0.2 mm Hg. Purity: 100%; Solubility: in organic solvents; insoluble in water. Chemical properties: high thermal stability. Suggested uses: intermediate for organic synthesis. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

CYCLOTETRADECANE

$C_{14}H_{28}$. M.W. 196; Sp.G., 0.942 at 25, 0.834 at 60, 0.809 at 105; M.P., 54-5 C; B.P., 110 C at 3.0 mm Hg. Purity: 100%; Solubility: in organic solvents; insoluble in water. Chemical properties: high thermal stability; high coefficient of expansion; sharp phase transition. Suggested uses: in temperature-sensing devices such as thermostats. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

D-269

Constituents: an acetate-maleate copolymer in organic solvent solution. Bulk density: 8.35 lbs./gal. Chemical properties: film cast from this copolymer solution is clear, soft, colorless, and tack-free, and has outstanding adhesion to smooth, non-porous surfaces. Suggested uses: in solvent adhesives; surface coatings. Introduced as: new chemical product. Availability: semicommercial quantities. Shawinigan Resins Corp., Marketing Div.

D-430-B

Constituents: the reaction product of a dialdehyde with a mixture of monopentaerythritol and dipentaerythritol. M.W., approx. 1000; M.P., approx. 220 C; Bulk density: 23 lbs./cu. ft.; Hydroxyl content: 5 to 7%; Viscosity: approx. 65 cps. Chemical properties: extremely solvent-resistant polymer with high softening point; resin contains hydroxyl groups which produce strong bonds to metal surfaces. Suggested uses: wire enamels; surface coatings. Introduced as: new chemical product. Availability: semicommercial quantities. Shawinigan Resins Corp., Marketing Div.

D-566

Constituents: a plasticized dispersion of high-viscosity polyvinyl butyral resin. Bulk density: 8.7 lbs./gal. Chemical properties: low tack, abrasion-resistant, high strength thermoplastic film having high adhesion to porous and non-porous surfaces; the plasticizer used is non-migratory and gives the film good heat and color stability. Suggested uses: aqueous-based baking primers; decorative and protective coatings for metal, wood, glass, and other materials; textile finishings; binder for non-woven fabrics; greaseproof and washable coatings for paper and textiles. Introduced as: new chemical product. Availability: semicommercial quantities. Shawinigan Resins Corp., Marketing Div.

DLTDP (didodecanyl thiodipropionate)

$C_{30}H_{58}SO_4$. M.W., 514; Setting Pt., 40 C min.; Assay, 98% min.; Odor, characteristic sweet; Color, APHA scale, 1:1 Toluene, 25 max., white; Heavy metals, 20 ppm max.; Acid No., 1 max. Chemical properties: leafy crystals; has F&DA approval for use at concentrations not greater than 0.02%. Suggested uses: an antioxidant for plastics, especially films used in food packaging. Introduced as: product with new degree of availability. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

DECERESOL SURFACTANT L (modified ester-linked alkane sulfonate)

Sp.G., 1.01; Color: white; pH, 3-5. Purity: 75% active; Solubility: disperses readily in water at 140 F in concentrations up to 1%; solution remains clear on cooling. Chemical properties: anionic, free-flowing paste. Suggested uses: low-foaming wetting agent. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid, Organic Chemicals Div.

DEVLEX 130 (poly-N-vinyl-5-methyl-2-oxazolidinone)

M.W., 165,000 (average); Sp. G., 30.5 lbs./cu. ft.; M.P., 250 C—fusing, 292 C—fused, some decomp.; Color: white. Solubility: >50% in water below 40 C, >25% methylene chloride, chloroform, dimethylformamide, >5% aniline, ethanol (90%, aq.), methanol (90%, aq.), lactic acid. Chemical properties: free-flowing powder; functional polymer designed expressly for molecular complexing and film-forming applications; offers possible solution to problems of odor, adverse taste, solubility, toxicity and stability with organic molecules of a polar nature or those capable of producing an induced dipole. Suggested uses: cosmetics and toiletries; textile dyeing operations; beverage clarification; agricultural chemicals; leather finishing; pharmaceuticals; molecular control; printing inks; protective and decorative coatings. Introduced as: new chemical product. Availability: semicommercial quantities. The Dow Chemical Co.

DEVLEX A515 (copolymer of N-vinyl-5-methyl-2-oxazolidinone and vinyl acetate)

Sp.G., 31.5 lb./cu. ft.; M.P., softening pt.: 115 C, 125-135 C; Color: white. Solubility: >50% methanol, ethanol (95% aq.), dimethylformamide, methylene chloride, 1,4-dioxane, acetone, 1.2% water, 3.0% benzene, 2.3% ethyl ether, 1.4% linseed oil. Chemical properties: free-flowing powder; functional polymer designed expressly for molecular complexing and film forming applications; films are hard, clear, water sensitive but possess a very low hygroscopicity. Suggested uses: cosmetics and toiletries particularly aerosol hair sprays and other fixatives; aerosol textile sizing; protective coatings including shoe polishes, sun screens, spray bandages and biochemical stickers. Introduced as: new chemical product. Availability: semicommercial quantities. The Dow Chemical Co.

DIAMINOBENZIDINE HYDROCHLORIDE

$C_{12}H_{16}N_4$ 4HCL. Purity: reagent grade; Solubility: in alcohol, water. Suggested uses: reagent for the determination of selenium. Introduced

NEW CHEMICALS IN INDUSTRY

as: new chemical product. Availability: laboratory quantities. Krishell Laboratories, Inc.

3,3'-DIAMINOBENZIDINE TETRAHYDROCHLORIDE

$(NH_2)C_6H_4C_6H_4(NH_2)\cdot 4HCl$. Purity: reagent grade. Suggested uses: reagent for the colorimetric determination of selenium. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

DIAMOND CR-85 (vinyl chloride, vinyl acetate copolymer)

Color: white; 100% through 40 mesh; Sp. Viscosity: 0.58; Bulk Density: 35.5 lb./cu. ft.; Volatiles: less than 1.5%. Chemical properties: fine powder. Suggested uses: in phonograph record stocks and rigid calendered sheeting; may be used as a processing aid in other Diamond PVC applications. Introduced as: significantly new grade. Availability: commercial quantities. Diamond Alkali Co., Plastics Div.

DIAMOND FCR (vinyl chloride, vinyl acetate copolymer)

Color: white; 100% through 40 mesh; Sp. Viscosity: 0.61; Bulk Density: 38 lb./cu. ft.; Volatiles, 1% max. Chemical properties: fine powder. Suggested uses: vinyl asbestos flooring applications. Introduced as: significantly new grade. Availability: commercial quantities. Diamond Alkali Co., Plastics Div.

DIAMOND PVC-62 (polyvinyl chloride resin)

Color: white; 100% through 40 mesh; Average Sp. Viscosity: 1.40; Bulk Density: 20.6 lb./cu. ft.; Moisture: 0.5% max. Chemical properties: powder; exceptionally high plasticizer absorption and rapid absorption rate. Suggested uses: cold dry blending resin for coated fabrics: calendered film, sheeting and tape stock; tubing and profile extrusion; elastomeric compounds for molded products. Introduced as: significantly new grade. Availability: commercial quantities. Diamond Alkali Co., Plastics Div.

DIAMOND PVC-70-70F (polyvinyl chloride resin)

M.W., high, dispersion grade; Color: white; 100% through 40 mesh; Sp. Viscosity: 1.80; Bulk Density: 17 lb./cu. ft. Chemical properties: fine powder. Suggested uses: plastisol and organosol dispersions. Introduced as: significantly new grade. Availability: commercial quantities. Diamond Alkali Co., Plastics Div.

DIBROMOPROPANOL (2,3-dibromo-1-propanol)

$CH_2BrCHBrCH_2OH$. M.W., 217.91; Sp.G., 2.120 at 20/4 C; B.P., 219 C. Purity: technical; Solubility: in acetone, alcohol, ether and benzene. Suggested uses: possible intermediate for the preparation of flame retardants, insecticides and pharmaceuticals. Introduced as: new chemical product. Availability: commercial quantities. Michigan Chemical Corp.

3,4-DICHLOROANILINE

M.W., 162; Crystallizing Pt.: 70.5 C. Purity: 97% min.; Solubility: in common organic solvents; insoluble in water. Suggested uses: intermediate for biologically active compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. Monsanto Chemical Co., Organic Chemicals Div.

1,4-DICHLOROBUTENE-2

$C_4H_6Cl_2$; Constituents: approx. 95% 1,4-dichlorobutene-2 trans-isomer. M.W., 125; Sp.G., 1.19; M.P., 3.5 C; B.P., 760 mm. at 158 C. Purity: about 95% trans-isomer; Solubility: miscible with hydrocarbons. Chemical properties: very reactive allylic chlorides. Suggested uses: synthesis of chemical intermediates; drug manufacture; cross-linking polymers. Introduced as: new chemical product. Availability: commercial quantities. Du Pont, Industrial & Biochemicals Dept.

1,2-DICHLOROETHYLENE

$C_2H_2Cl_2$. Constituents: mixed isomers. M.W., 97.0; Sp.G., 1.265 at 25/25 C; M.P., −57 C; B.P., 46-64 C. Purity: 95-99%. Chemical properties: solvent for oils, fats, waxes. Suggested uses: extraction solvent for processes with heat sensitive materials. Introduced as: product with new degree of availability. Availability: commercial quantities. Dow Chemical Co.

1,2-DICHLOROINDANE

$C_9H_8Cl_2$. M.W., 187; B.P., 110-7 C/5 mm.; n, 25 C/D = 1.57; d, 25 C/4 C = 1.28. Solubility: soluble in hydrocarbons and chlorinated hydrocarbons; insoluble in water. Suggested uses: chemical specialty and pharmaceutical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Neville Chemical Co.

7,7-DICHLORO-NORCARANE (2,2-dichloro-bicyclo-[4,1,0]heptane)

$C_7H_{10}Cl_2$. M.W., 165.2; B.P., 15 mm. at 78 C. Purity: 99%+; Solubility: in common organic solvents; insoluble in water. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., Baker & Adamson Div.

2,6-DICHLOROSTYRENE

C_4H_3Cl. M.W., 172; B.P., 92-94 C at 5 mm. Purity: 97-98%; Solubility: in most organic solvents; insoluble in water. Chemical properties: will polymerize slowly on standing, unless inhibited. Suggested uses: monomer and comonomer—plastic research. Introduced as: new chemical product. Availability: semicommercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

DICHLOROTETRAFLUOROACETONE

$CClF_2\cdot CO\cdot CClF_2$. M.W., 198.94; B.P., 45.2 C; Color: water white. Solubility: miscible in all proportions with water in which it dissolves exothermically; miscible with most organic solvents. Chemical properties: lachrymatory liquid; stable to acids but attacked by alkalies. Suggested uses: solvent in acidic media; complexing agent for separations involving active hydrogen compounds. Introduced as: new chemical product. Availability: semicommercial quantities. Allied Chemical Corp., General Chemical Div.

DICYCLOHEXYLAMINE

$C_{12}H_{23}N$. M.W., 181.21; Sp.G., 0.9130 at 20/20 C; M.P.,—1 C; B.P., 254 C at 760 mm.; Fl. Pt., 228 F COC; Color: water white. Purity: 99+%; Solubility: miscible with benzene, ethanol (95%), acetone, and carbon tetrachloride; insoluble in water. Chemical properties: very reactive secondary amine; N-substituted products readily formed; quaternary salts formed with mineral acids; soaps formed with fatty acids. Suggested uses: chemical intermediate in preparation of corrosion inhibitors, dye intermediates, antiseptics, detergents, paint driers, rubber processing agents, and fuel additives. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

DIETHYLAMINOETHOXYETHANOL

$(C_2H_5)_2N\,C_2H_4OC_2H_4OH$. M.W., 162.2; Sp.G., 0.930-0.950 at 20/20 C; B.P., 95% distills between 215.0-228.0 C. Introduced as: new chemical product. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

DI-2-ETHYLHEXYL MALEATE

M.W., 340; Sp.G., 0.94; B.P., 203 C. Suggested uses: monomer and comonomer in manufacture of resins for use in surface coatings, textile finishes and molding compounds. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

DIETHYL MALEATE

M.W., 172; Sp.G., 1.07; M.P., −10.5 C; B.P., 225 C. Purity: 99%; Solubility: in alcohol, ether and benzene. Suggested uses: modifying comonomer for addition polymers; chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

0,0-DIETHYLPHOSPHOROISOTHIOCYANATOTHIONATE

$(C_2H_5O)_2$ PSNCS. M.W., 211.27; B.P., 78 C at 1.0 mm.; $h_{25}D$, 1.5210. Purity: 95%; Solubility: in acetone, benzene, hexane and most common organic solvents. Chemical properties: reactive isothiocyanate group; undergoes addition with amines, alcohols and salts of active hydrogen compounds. Suggested uses: intermediate in organic synthesis. Introduced as: new chemical product. Availability: laboratory quantities. Victor Chemical Works, Div. of Stauffer Chemical Co.

0,0-DIETHYLPHOSPHOROISOTHIOCYANATIDATE

$(C_2H_5O)_2$ PONCS. M.W., 195.23; B.P., 88 C at 1.0 mm.; $h_{25}D$, 1.4773. Purity: 99+%; Solubility: in acetone, benzene, hexane and most common organic solvents. Chemical properties: reactive isothiocyanate group; undergoes addition with amines, alcohols, thiols and salts of active hydrogen compounds. Suggested uses: intermediate in organic synthesis. Introduced as: new chemical product. Availability: laboratory quantities. Victor Chemical Works, Div. of Stauffer Chemical Co.

DI-(β-HYDROXYETHYL) ETHER OF HYDROQUINONE (p-di-[2-hydroxyethoxy]benzene)

$C_{10}H_{14}O_4$. M.W., 198.2; M.P., 101-103 C; B.P., 185-200 C at 0.3 mm; Water Content: 0.05%; 555-565 hydroxyl number. Solubility: <1% in water, benzene, hexane and VM&P naphtha; 1% in ethyl acetate; 4% in acetone and ethanol; miscible with water at 80 C. Chemical properties: stable ether linkages, reactive ring hydrogens, two primary alcohol groups. Suggested uses: chemical intermediate in preparation of polyesters, polyurethanes and polyethers. Introduced as: product with new degree of availability. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

DIISODECYL FUMARATE; MALEATE

M.W., 396; Sp.G., 0.93. Suggested uses: monomer and comonomer in manufacture of resins for use in surface coatings, textile finishes and molding compounds. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

DIISOOCTYL FUMARATE; MALEATE

M.W., 340; Sp.G., 0.94; B.P., 219 C, 207 C. Suggested uses: monomer and comonomer in manufacture of resins for use in surface coatings, textile finishes and molding compounds. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

DILAURYL THIODIPROPIONATE (3,3'-didodecyl thiodipropionate)

$C_{30}H_{58}O_4S$; Constituents: 98% dilauryl thiodipropionate; 2% dimyristyl thiodipropionate. M.W., 516; Sp.G., (solid) −0.975 at 25 C; M.P., 37 C min.; Saponification No.: 210-220; Acid No.: 1.0 max.; Sulfur: 6.0% min.; Color (APHA): 50 max. Purity: 99% min.; Solubility: insoluble in water; very soluble in benzene, acetone, isopropanol and olefin polymers. Chemical properties: anti-oxidant, stabilizer; FDA approved to certain concentrations; low toxicity; extremely resistant to heat and hydrolysis. Suggested uses: anti-oxidant for polyolefins, edible materials and soap; additive for high-pressure lubricants and greases; plasticizer and softening agent. Introduced as: product with new degree of availability. Availability: commercial quantities. Halby Products Co., Inc.

DIMEDONE (5,5-dimethylcyclohexane-1,3-dione)

$C_8H_{12}O_2$. M.W., 140.18; M.P., 148-150 C. Solubility: in methanol, ethanol, chloroform, benzene and acetic acid; 3.8 parts soluble in 100 parts of water at 90 C, 0.4 parts soluble in 100 parts of water at 20 C. Chemical properties: forms water-soluble condensation products with aldehydes (4 ppm of formaldehyde in 50 ml can be detected); couples with certain diazonium compounds. Suggested uses: in analysis, for the detection and determination of aldehydes; in the preparation of light sensitive azo dyes; in photography; as organic intermediate. Introduced as: product with new degree of availability. Availability: commercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

DIMETHYLACETAMIDE (DMAC) (N,N-dimethylacetamide)

M.W., 87.12; Sp.G., 0.943 at 20/4 C; B.P., 165.6 C. Purity: 99+%; Solubility: completely miscible with water, ketones, esters, ethers, and aromatic compounds. Chemical properties: extremely efficient polar solvent for polymers, pharmaceuticals, gases, etc. Suggested uses: solvent and catalyst for resin systems. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Organic Chemicals Div.

DIMETHYLAMINE-60%

C_2H_7N. M.W., 45.08; Sp.G., 0.833; Water content: 60%. Purity: 60%; Solubility: in wide range of organic solvents. Chemical properties: vapor pressure: 9.8 lbs./in.^{2} at 20 C; 2.4 lbs./in.^{2} for 40% solution. Suggested uses: conversion to: unsymmetrical dimethylhydrazine; dithiocarbamates used in rubber vulcanization and agricultural fungicides; surface-active agents; dyestuffs; pharmaceuticals. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Special Products Dept.

2,5-DIMETHYL BENZYL CHLORIDE (2,5-dimethyl-α-chlorotoluene)

$C_9H_{11}Cl$. M.W., 154.64; B.P., 220-226 C. Purity: 98% min.; Solubility: in hydrocarbons, alcohols and ethers; insoluble in water. Chemical properties: reactive chlorine may be replaced by a nitrile group; nitrile converted to an ester, acid or amide; further chlorination yields benzal and benzo trichloride hydrolyzable to corresponding aldehyde and acid. Suggested uses: intermediate for preparation of pharmaceuticals, dyestuffs, perfume bases, plasticizers, resins, wetting agents, germicides, rubber accelerators, gasoline gum inhibitors, etc. Introduced as: new chemical product. Availability: commercial quantities. Benzol Products Co., Research & Development.

N,N-DIMETHYLCYCLOHEXYLAMINE

$C_8H_{17}N$; M.W., 127.22; Sp.G., 0.8490 at 20/20 C; M.P., <−77 C; B.P., 157-160 C at 760 mm.; Flash Pt.: 110 F COC. Purity: 99+%; Solubility: miscible with benzene, ethanol (95%), acetone, and carbon tetrachloride; 1.1% in water. Chemical properties: clear colorless liquid; as tertiary amine is relatively nonreactive; N-substituted products are formed after demethylation; forms quaternary ammonium salts or addition compounds with a variety of chemicals. Suggested uses: textile, rubber, polyurethane, germicidal and insecticidal applications. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

DIMETHYL MALEATE

M.W., 144; Sp.G., 1.14; M.P., −20.6 C. Suggested uses: as a modifying comonomer for addition polymers, and as a chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

N,N'-DIMETHYLPIPERAZINE (1,4-dimethylpiperazine)

$C_6H_{14}N_2$. M.W., 114; Sp.G., 0.8565 at 20/4 C; B.P., 131 C; Flash pt., 85 F TOC; Color: Pt-Co 75 max., Other amines, 0.50 wt. % max.; Water content, 0.50 wt. % max. Purity: above 95%. Chemical properties: exhibits chemical reactions of a di-tert. amine. Suggested uses: curing agent for high load-bearing one-shot polyether urethane foams; intermediate for preparations of cationic surface-active agents. Introduced as: product with new degree of availability. Availability: semicommercial quantities Jefferson Chemical Co., Inc., Commercial Development Div.

α-p-DIMETHYLSTYRENE (1-methyl-1-p-methylphenylethylene)

C_9H_{10}. M.W., 118; B.P., 45 C at 0.5mm. Purity: 97-99%; Solubility: insoluble in water; soluble in most organic solvents. Chemical properties: vinyl derivative, undergoes polymerization. Suggested uses: as monomer and comonomer in plastic research. Introduced as: new chemical product. Availability: laboratory quantities. Gallard-Schlesinger Chemical Mfg. Corp.

N,N-DIMETHYL SULFAMYL CHLORIDE

$C_2H_6ClNO_2S$. M.W., 143.6; B.P., 66 C at 10 mm. Purity: 95%; Solubility: in common organic solvents; insoluble in water. Chemical properties: reacts with amines, sodium alcoholates, sodium phenates, etc. to give the corresponding amides and esters; lachrymator and skin irritant. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., Baker & Adamson Div.

DIMETHYL-2,3,5,6-TETRACHLORO-TEREPHTHALATE, 95% GRADE

$C_{10}H_6O_4Cl_4$. M.W., 331.99; M.P., 154-155 C; B.P., 336 C at 750mm; 210 C at 20mm Hg; Color: white. Purity: 95% +; Solubility: at 25 C tetrahydrofuran 18%; acetone 10%; benezene 16%; dioxane 11%; carbon tetrachloride 7%; water 0%. Chemical properties: two reactive ester groups for transesterification. Suggested uses: polyesters, flame retardant polyesters, polymers. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

2,4-DINITROSORESORCINOL

$C_6H_4N_2O_4 \cdot H_2O$. M.W., 186.13; M.P., 162-163, decomposes, sometimes violently. Color: light brown. Purity: technical grade 13.7% nitrogen; Solubility: very soluble in water, benezene, chloroform, acetone; moderately soluble in methanol and pyridine. Chemical properties: powder; forms complex compounds with heavy metal, reacts as a quinone oxime and as a diketone. Suggested uses: chelation of heavy metals; crosslinking agent in vulcanizing butyl rubber. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals and Dyestuffs Div.

DIOCTYL THIODIPROPIONATE (3,3'-[2-ethylhexyl] thiodipropionate)

$C_{22}H_{42}O_4S$. M.W., 403; Sp.G., 0.952 at 25 C; Saponification No.: 275-285; Acid No.: 1.0 max.; Sulfur: 7.5% min.; Color (APHA): 50 max. Purity: 99% min.; Solubility: insoluble in water; very soluble in benzene, acetone, isopropanol, polyolefin polymers. Chemical properties: good lubricity; anti-oxidant and stabilizer. Suggested uses: synthetic greases & lubricants for extreme conditions; plasticizer and softening agent for vinyls & other synthetics. Introduced as: new chemical product. Availability: semicommercial quantities. Halby Prods. Co., Inc.

DI-n-OCTYLTHIOUREA

$C_8H_{17}NH\ C\ S\ NH\ C_8H_{17}$. M.W., 401.1 (cal'd); M.P., 50-54 C. Introduced as: new chemical product. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

DIPHENIC ACID (2,2'-biphenyldicarboxylic acid)

$C_{14}H_{10}O_4$. M.W., 242.08; M.P., 230-231 C; B.P., sublimes. Purity: 97% min.; Solubility: (g./100 ml. solution) at 25 C; methanol 28.10, cyclohexanone 9.56, acetone 6.82, water 0.19, benzene 0.02. Chemical properties: may be esterified by mild acid catalysts and mild dehydration conditions. Suggested uses: potentially in alkyd and unsaturated polyesters, synthetic lubricants, high polymers, plasticizers. Introduced as: new chemical product. Availability: pilot plant quantities. Koppers Company, Inc., Tar Products Div.

3,5-DISULFOBENZOIC ACID

$C_7H_6O_8S_2$. M.W., 318.21; Color: white. Purity: C.P.; Solubility: in water. Chemical properties: powder; reacts with sulfonic acid and carboxylic acid groups. Suggested uses: intermediate for detergents, dyes and pharmaceuticals. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals and Dyestuffs Div.

DITHANE A-40 (disodium ethylene bisdithiocarbamate)

$(-CH_2NHCSSNa)_2$. M.W., 255.8; M.P., 220-235 C; Color: yellow. Purity: 93%; Solubility: in water. Chemical properties: free-flowing powder. Suggested uses: agricultural fungicide. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas Co., Agricultural and Sanitary Chemicals Dept.

DITRIDECYL THIODIPROPIONATE (3,3'-tetramethylnonyl thiodipropionate)

$C_{32}H_{62}O_4S$. M.W., 542; Sp.G., 0.932 at 25 C; Saponification No: 200 — 210; Acid No: 1.0 max.; Sulfur: 5.7% min.; Color (APHA): 100 max. Purity: 99% min.; Solubility: insoluble in water; very soluble in benzene, acetone, isopropanol, & polyolefin polymers. Chemical properties: extremely resistant to heat and hydrolysis; anti-oxidant and stabilizer; good lubricity. Suggested uses: polypropylene stabilizer; extreme pressure grease and lubricant; plasticizer and softening agent; anti-oxidant and preservative. Introduced as: new chemical product. Availability: semicommercial quantities. Halby Products Co., Inc.

DISTEARYL THIODIPROPIONATE (3,3'-dioctadecyl thiodipropionate)

$C_{42}H_{82}O_4S$. M.W., 683; M.P., 55 C min.; Saponification No: 155-175; Acid No: 1.0 max.; Sulfur: 4.5% min.; Color (APHA): 100 max. Purity: 99% min.; Solubility: insoluble in water; very soluble in benzene and olefin polymers. Chemical properties: low toxicity; extremely resistant to heat and hydrolysis; anti-oxidant and stabilizer. Suggested uses: anti-oxidant for polyolefins, greases, waxes; additive for high-pressure lubricants and greases; plasticizer and softening agent. Introduced as: new chemical product. Availability: semicommercial quantities. Halby Products Co., Inc.

DOCOSANE-1,22-DIOIC ACID

$C_{22}H_{42}O_4$. M.W., 370.5; M.P., 130-1 C. Purity: 99%+; Solubility: sparingly soluble in cold organic solvents; insoluble in water; soluble in aqueous alkali. Chemical properties: straight chain dibasic acid. Suggested uses: condensation polymerization monomer. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

2,8,14,20-DOCOSATETRAYNE-1,22-DIOIC ACID

$C_{22}H_{26}O_4$. M.W., 354; M.P., 104-5 C. Purity: 99%+; Solubility: in organic solvents and bases; insoluble in water. Chemical properties: straight chain polyacetylenic diacid of good thermal stability. Suggested uses: condensation polymerization monomer; chemical intermediate through reactions involving the acetylenic linkage and/or the carboxy groups. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

DODECAHYDROFLUORENE

$C_{13}H_{22}$. M.W., 178.32; Sp.G., 0.9507 at 15 C; B. P., 135-37 C at 20 mm Hg. Purity: approx. 99%; Solubility: very soluble in benzene, acetone, ether and methanol; insoluble in water. Chemical properties: stable high-boiling hydrocarbon. Suggested uses: reaction solvent; low volatile paint vehicle; plasticizer. Introduced as: new chemical product. Availability: laboratory quantities. Koppers Company, Inc., Tar Products Div.

DODECYLANILINE

Constituents: infrared analyses indicate that 90-95% of the alkyl substituent is in the para position. M.W., theory = 261; Sp.G., 0.907-0.912 at 25/25 C; B.P., 340-350 C. Solubility: in acetone, benzene, ether, chlorobenzene, insoluble in water. Chemical properties: oil soluble aromatic amine. Suggested uses: intermediate for corrosion inhibitors, emulsifiers, surfactants, asphalt additives, lubricants, or grease compositions. Introduced as: product with new degree of availability. Availability: commercial quantities. Monsanto Chemical Co., Organic Chemicals Div.

DOW CORNING 199

Constituents: silicone-glycol copolymer. Sp.G., 1.02. Solubility: in polyglycols, toluene diisocyanate, and amines; insoluble in water. Chemical properties: effective at very low concentrations; produces low foam densities and better foam stability; quantities are less critical than with older additives. Suggested uses: cell-control additive for polyurethane foams. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

DOWFAX 9N4; 6 NONIONIC SURFACTANT (nonylphenyl polyethylene glycol ether)

$C_9H_{19}C_6H_4(OCH_2)_4OH$. Sp.G., 1.03-1.04 at 20/20; Per cent active: 100. Solubility: in aliphatic and ethylene aromatic hydrocarbons, chlorinated solvents; insoluble in water and glycol. Chemical properties: solubility in hydrocarbons such as kerosene and mineral oil proves useful where oil-soluble nonionic surfactants are of interest. Suggested uses: preparing water-in-oil emulsions for dry cleaning formulations, emulsion cleaners and other industrial detergent formulations; chemical intermediate for high-foaming, water soluble sulfated anionic derivative. Introduced as: new chemical product. Availability: laboratory quantities. Dow Chemical Co.

DOWFAX 9N9;10;15;20;40 NONIONIC SURFACTANT (nonylphenyl polyethylene glycol ether)

$C_9H_{19}C_6H_4(OCH_2CH_2)_{9\text{-}10}OH$. Sp.G., 1.057-1.08 at 20/20; 40/20; 50/20 C; Cloud pt of 0.1% soln: 52-56; 66-70; 94-98; >100 C; Per cent active: 100. Solubility: in water, alcohols, glycols, ketones, esters, glycol-ethers, chlorinated aromatic hydrocarbons; insoluble in aliphatic hydrocarbons. Chemical properties: most versatile of all nonylphenol ethylene oxide adducts with an unusual balance of emulsifying, excellent detergency, penetrating, solubilizing, dispersing and outstanding wetting properties. Suggested uses: agricultural toxicant emulsifier and wetting agent; multi-purpose

NEW CHEMICALS for INDUSTRY

stabilizer for latex paints, industrial cleaners, household detergents, leather, metal processing, pulp and paper, textile, and petroleum. Introduced as: new chemical product. Availability: commercial quantities. Dow Chemical Co.

DURATONE
(organophilic colloid)

Color: black. Chemical properties: free-flowing powder; filtrate reducing agent and stabilizing agent for oil base (oil emulsion) drilling mud. Suggested uses: additive for oil-base and water-in-oil emulsion oil-well drilling fluids to control filtration, suspend solids and adjust flow properties. Introduced as: new chemical product. Availability: commercial quantities. Baroid Div., National Lead Co.

DURENE
(1,2,4,5-tetramethylbenzene)

$C_{10}H_{14}$. M.W., 134.11; Sp.G., 0.837 at 85 C; M.P., 78.2 C; B.P., 194-196 C. Purity: 95.0 wt. %; Solubility: in alcohol, ether, benzene; very soluble in acetic acid; insoluble in water. Chemical properties: reactive para positions, oxidation yields pyromellitic anhydride. Suggested uses: synthetic fibers, films, plastics, protective coatings, plasticizers, resins, dyes. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

N-DUROYLPROPIONIC ACID
(4-phenyl-3-keto-1-butanoic acid)

$C_{10}H_{10}O_3$. M.W., 178.2; M.P., 126-128 C. Purity: 95% +; Solubility: in organic solvents, hot alkaline solutions; insoluble in water. Chemical properties: typical of carboxyl and keto groups. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., Baker & Adamson Div.

DYPHOS XL
(modified dibasic lead phosphite)

Sp.G., 6.4; Color: white. Purity: high. Chemical properties: fine powder; improved heat stability; increased insulation resistance; improved physical and mechanical properties; excellent processing characteristics; outstanding stabilizer for light and outdoor weathering. Suggested uses: special electrical grade stabilizer; particularly recommended for semi-rigid and rigid electrical insulation compounds; for use in any vinyl insulation compound requiring resistance to light and outdoor weathering. Introduced as: significantly new grade. Availability: commercial quantities. National Lead Co.

DYTHAL XL
(modified dibasic lead phthalate)

Sp.G., 4.3; Color: white. Purity: high. Chemical properties: fine powders; improved heat stability; increased insulation resistance; improved physical and mechanical properties; excellent processing characteristics. Suggested uses: special electrical grade stabilizer for improving particularly difficult vinyl electrical insulation stocks in the U. L. Classification of 105 C. Introduced as: significantly new grade. Availability: commercial quantities. National Lead Co.

DYTOL R-52
(tetradecanol)

$C_{14}H_{30}O$; Constituents: 1.6% C_{12}, 1.0% C_{16}, 0.9% C_{18}. M.W., 214; Hydroxyl No: 252; Ester Value: 1.9; Acid No: 0.75; Iodine No: 0.97; Color (APHA): 35. Purity: 96.5%. Suggested uses: conversion to quaternary ammonium compounds; ethoxylated and sulfated derivatives for the detergent and cosmetic fields; mercaptan for rubber polymerization applications. Introduced as: new chemical product. Availability: commercial quantities. Rohm & Haas, Special Products Dept.

EASTMAN INHIBITOR OPS
(p-octylphenyl salicylate)

$C_{21}H_{26}O_3$. M.W., 326.4; M.P., 72-74 C; Color: white. Solubility: g./100g. solvent: 127.2 in acetone, 144.1 in benzene, 37.0 in hexane, 4.5 in ethanol, <0.1 in di-(2-ethylhexyl phthalate). Chemical properties: crystalline solid; good compatibility with polyethylene and polypropylene. Suggested uses: ultraviolet stabilizer for polyolefins. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

EASTMAN INHIBITOR THBP
(2,4,5-trihydroxybutyrophenone)

$C_{10}H_{12}O_4$. M.W., 196; M.P., 149-153 C; Color: yellow-tan. Solubility: 25% in ethanol, 30% in propylene glycol, 5% in mineral oil, 0.5% in water (50 C). Chemical properties: crystal; excellent compatability with polyolefins and paraffin waxes; relatively nonvolatile in plastic formulations; nonstaining in low concentrations. Suggested uses: antioxidant for polyolefins, various paraffin waxes, and mineral oil. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

1,7,13,19-EICOSATETRAYNE

$C_{20}H_{26}$. M.W., 266.4; Sp.G., 0.883 at 25 C; 0.834 at 105 C; M.P., 19 C; B.P., 165-70 C at 0.3 mm Hg. Purity: 99%+; Solubility: in organic solvents; insoluble in water. Chemical properties: linear nonconjugated polyacetylene of excellent heat stability. Suggested uses: energetic rocket fuel plasticizer extender, binder; organic chemicals intermediate; oil well corrosion inhibitor. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

EICOSYL ALCOHOL

$C_{20}H_{42}O$. M.W., 298.33; Sp.G., 0.8519 at 20/20 C; M.P., <−45 C; B.P., 400-420 F at 20 mm; Hdroxyl No: 179 mg KOH/g; Carbonyl No: 1.2 mg KOH/g; Saponification No: 1.0 mg KOH/g. Purity: 95 wt. %. Chemical properties: liquid branched chain, primary alcohol; composed of complex array of isomeric structures; carbinol group located in middle of long-branched chain. Suggested uses: detergents; surfactants; plasticizers; synthetic lubricants; petroleum additives; textile lubricants. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

EMPOL 1014; 1024 DIMER ACID

Constituents: 95; 75% dimer acid (C_{36} dibasic); 4; 25% trimer acid (C_{54} tribasic); 1% C_{18} monobasic acids. Sp.G., 0.94 at 25/20 C; 0.90 at 100/20 C. Acid Value: 188-193; 186-194; Saponification Value: 194-198; 191-199; unsaponifiable, 1; 2% max.; Color: 8; 11 Gardner max.; Monobasic acids (distillate below 270 C at 2-5 mm Hg), 1.5; 0% max. Purity: 95% dimer acid; Solubility: in acetone, alcohol benzene, ethyl ether, Stoddard solvent, petroleum ether; insoluble in water. Chemical properties: a high purity, C_{36} dicarboxylic aliphatic acid; imparts flexibility to large molecules. Suggested uses: in polyamides, polyesters, expoxy resins and esters; varnishes and alkyds. Introduced as: significantly new grade; product with new degree of availability. Availability: commercial quantities. Emery Industries, Inc., Organic Chemicals Div.

EMULSION MC-4530
(acrylic copolymer emulsion)

Constituents: 45% solids. Chemical properties: excellent physical properties, chemical resistance, exterior durability in formulations; low foaming. Suggested uses: cement additive for mortars, overlays, and patching; temporary binder for ceramics. Introduced as: new chemical product. Availability: semicommercial quantities. Rohm & Haas, Resinous Products Div.

EPOTUF 37-129
(epoxy resin)

Epoxide Equivalent: 180-185; Viscosity: 840 cps. at 77 F; B.P., 150 C at 5 mm. Hg Absolute. Per cent active: 100. Chemical properties: exceptionally low-viscosity; unique in its freedom from volatility and odor; excellent handling and curing characteristics even in thin films. Suggested uses: vacuum casting and impregnating; floor surfacing compounds; open lay-up laminating. Introduced as: new chemical product. Availability: commercial quantities. Reichhold Chemicals, Plastics Div.

EPOTUF ED-1020
(epoxy resin)

Per cent active: 100. Chemical properties: self-extinguishing; non-crystallizing; relatively low in viscosity for a fire-retardant epoxy. Suggested uses: electrical castings, laminating, and pre-preg applications. Introduced as: new chemical product. Availability: semicommercial quantities. Reichhold Chemicals, Plastics Div.

ESCON POLYPROPYLENE

Sp.G., 0.897-0.910 at 73 F. Chemical properties: new thermoplastic resin produced by closely controlled polymerization of propylene; may be fabricated by all the techniques common to plastics industry. Suggested uses: aircraft interiors, automotive, business machines, communications, construction, containers, cordage, dust work, home appliances, laboratory utensils, lawn furniture, luggage, packaging, pipe fittings, seat covers, toys, valves. Introduced as: significantly new grade. Availability: commercial quantities. Enjay Chemical Co., Market Development.

ETHYL CHLOROTHIOLFORMATE

C_2H_5SCOCl. M.W., 124.6; Sp.G., 1.189; B.P., 132.5 C. Flash Pt: 125 F. Color: slightly yellow. Solubility: miscible with aromatic and aliphatic hydrocarbons, acetone, and ethers. Chemical properties: liquid; reactive chemical intermediate. Suggested uses: modify physical properties of compounds containing free hydroxyl, amino, and mercapto groups. Introduced as: new chemical product. Availability: laboratory quantities. Stauffer Chemical Co. Market Development Dept.

ETHYL 4-PHENYLPIPERIDINE-4-CARBOXYLATE HCl

$C_{14}H_{19}O_2N{\cdot}HCl$ M.W., 269.7; M.P., 134.6-136.0 C. Purity: over 95%. Suggested uses: laboratory synthesis of analgesics, etc. Introduced as: new chemical product. Availability: laboratory quantities. Winthrop Laboratories, Special Chemicals Div.

FERRIC ACETYLACETONATE

$Fe(C_5H_7O_2)_3$. M.W., 353.17; M.P., 179 C. Particle size: 100% through 325 mesh; Benezene insolubles: 0.09% at 77 F, wt. % max.). Volatiles: wt-%, max. (2 hrs, 40-50 C, 5 mm pressure) 0.01% max. Solubility: readily in alcohol, ether, chloroform, benzene and hydrocarbons; g/100g solvent at 30 C, benzene 22.3g, ethyl alcohol (95%) 5.51g. Suggested uses: moderating catalyst for solid propellants; bonding agent for resin-to-metal use; combustion catalyst; carbon scaventer for diesel fuels; filler in polymers; curing accelerator for polyurethane resins; paint dryer; intermediate for syntheses; light-fast pigment for concrete; resin stabilizer; catalyst for wide range of applications. Introduced as: significantly new grade. Availability: commercial quantities. MacKenzie Chemical Works, Inc.

FERROUS ACETYLACETONATE

$Fe(C_5H_7O_2)_2$. M.W., 254.07; M.P., decomp. 375. Solubility: in benzene; slightly soluble in alcohol. Introduced as: new chemical product. Availability: semicommercial quantities. MacKenzie Chemical Works, Inc.

FLUORENE

$C_{13}H_{10}$. M.W., 166; M.P., 107-110 C. Purity: approx. 90%; Solubility: in benzene, carbon disulfide, ether. Suggested uses: dyestuffs, pharmaceuticals, organic intermediates. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Koppers Co., Inc., Tar Products Div.

9,9-FLUORENEDIPROPIONIC ACID
(9,9-bis[2-carboxyethyl]-fluorene)

$C_{19}H_{18}O_4$. M.W., 310.35; M.P., 276-278. Purity: approx. 99%; Solubility: in t-butyl alcohol 1.3 at 25 C; isopropyl alcohol 2.2% at 25 C; methyl alcohol 4.9% at 25 C; water 0.03% at 100 C. Chemical properties: readily esterified to esters of very low vapor pressure; the disodium salt is extremely soluble in water (about 70%). Suggested uses: preparation of polyesters, polyamides, and ester type plasticizers. Introduced as: new chemical product. Availability: laboratory quantities. Koppers Co., Inc., Tar Products Div.

9,9-FLUORENEDIPROPIONITRILE
(9,9-bis[2-cyanoethyl)]-fluorene)

$C_{19}H_{16}N_2$. M.W., 272.35; M.P., 121-122 C; B.P., 331 C at 50 mm. Hg. Purity: approx. 98%; Solubility: n-hexane 0.01% at 25 C; isopropyl alcohol 0.53% at 25 C, 38.7% at 80 C; ethyl alcohol 2.0% at 25 C, 25.0% at 78 C; toluene 14.2% at 25 C. Chemical properties: typical nitrile behavior on reduction and hydrolysis; rearranges to spiranes with potassium t-butoxide. Suggested uses: plasticizer in heat sealing adhesives; adhesive formulations; organic intermediate. Introduced as:

new chemical product. Availability: laboratory quantities. oppers Co., Inc., Tar Products Div.

9,9-FLUORENEDIPROPYLAMINE (9,9-bis[3-aminopropyl]-fluorene)

$C_{19}H_{24}N_2$. M.W., 280.42. Sp.G., 1.01 at 107 C; M.P., 99 C; B.P., 188 C at 1 mm Hg 244 C at 5 mm Hg. Purity: approx. 98% +; Solubility: at 30 C: water 0.1%; hexane 3.0%; toluene >50; methanol >50%; methyl ethyl ketone 80%. Chemical properties: high boiling diamine having properties intermediate between those of aromatic and aliphatic amines. Suggested uses: curing agent for epoxy resins: dye intermediate; intermediate in preparation of polyamides; intermediate for chelating agents. Introduced as: new chemical product. Availability: laboratory quantities. Koppers Co., Inc., Tar Products Div.

FLUSHED SOLFAST BLUE FL-11-350-378 (flushed phthalocyanine blue)

Constituents: 17% pigment; 31% resin solids; 52% odorless mineral spirits. Sp.G., 0.94. Purity: commercial. Chemical properties: flocculation resistant red shade blue pigment; FL-11-378 flushed in an odorless general purpose alkyd varnish, FL-11-50 flushed in alkyd made with regular mineral spirits. Suggested uses: in trade sales enamels. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

FOAM ADDITIVE NO. 2 (trihydroxy dialkyl phosphonate)

Constituents: P 8.7%; OH 12.3% M.W., 356 (ave.); Sp.G., 1.258 at 25 C; B.P., dec. above 150 C; Acid No.: <60. Solubility: in water, alcohol, acetone, benzol, chlorinated hydrocarbons; insoluble in hexane. Chemical properties: contains trifunctional polyol, capable of forming polyesters and polyurethanes. Suggested uses: in polyester resins or polyurethane foams as an additive or copolymer to impart flame resistance. Introduced as: new chemical product. Availability: semicommercial quantities. Victor Chemical Works, Div. Stauffer Chemical Co.

FOAM ADDITIVE NO. 6 (dialkylolamino derivative of a dialkyl phosphonate)

Constituents: P 12.2%; N 5.7%; OH 13.8%. M.W., 253; Sp.G., 1.159 at 25 C; B.P., >150 C; Acid No.: <25. Solubility: in water, alcohol, benzol, chlorinated hydrocarbons; insoluble in hexane. Chemical properties: a weakly basic bifunctional polyol containing nitrogen and phosphorus; capable of forming polyesters and polyurethanes; capable of catalytic action in reaction with isocyanates. Suggested uses: in polyester resins or polyurethane foams as an additive or copolymer to impart flame resistance. Introduced as: new chemical product. Availability: semicommercial quantities. Victor Chemical Works, Div. Stauffer Chemical Co.

FOAM ADDITIVE NO. 8 (dihydroxy alkyl phosphate)

Constituents: P 7.7%; OH 9.2%. M.W., 400 (ave.); Sp.G., 1.202 at 25 C; B.P., >150 C; Acid No.: <4. Solubility: in water, alcohol, chlorinated hydrocarbons; slightly soluble in benzol; insoluble in hexane. Chemical properties: phosphorus containing bifunctional polyol capable of forming polyesters and polyurethanes. Suggested uses: in polyester resins or polyurethane foams as an additive or copolymer to impart flame resistance. Introduced as: new chemical product. Availability: semicommercial quantities. Victor Chemical Works, Div. Stauffer Chemical Co.

FOAM ADDITIVE NO. 12 (dihydroxy dialkyl phosphonate)

Constituents: P 9.6%; OH 8.4%. M.W., 324 (ave.); Sp.G., 1.160 at 25 C; Acid No.: <6; Solubility: in alcohol, benzol, chlorinated hydrocarbons; slightly soluble in water; insoluble in hexane. Chemical properties: phosphorus containing bifunctional polyol capable of forming polyesters and polyurethanes. Suggested uses: in polyester resins or polyurethane foams as an additive or copolymer to impart flame resistance. Introduced as: new chemical product. Availability: semicommercial quantities. Victor Chemical Works, Div. Stauffer Chemical Co.

FOAM ADDITIVE NO. 13 (dihydroxy dialkyl phosphonate)

Constituents: P 9.3%; Cl 10.7%; OH 10.0%. M.W., 338 (ave.); Sp.G., 1.195 at 25 C; B.P., >150 C; Acid No.: <30. Solubility: in water, alcohol, benzol, chlorinated hydrocarbons; insoluble in hexane. Chemical properties: phosphorus and chlorine containing bifunctiona. polyol capable of forming polyesters or polyurethanes. Suggested uses: in polyester resins or polyurethane foams as an additive or copolymer to impart flame resistance. Introduced as: new chemical product. Availability: semicommercial quantities. Victor Chemical Works, Div. Stauffer Chemical Co.

FOSBOND 24

Constituents: modified phosphate. Chemical properties: liquid phosphatizing product to deposit iron phosphate coating on steel to improve adhesion and corrosion protection. Suggested uses: phosphatizing prior to painting. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

FOSBOND 35

Constituents: phosphoric acid; high concentration of surfactants. Chemical properties: acidic liquid; good soil penetrating ability; very free rinsing. Suggested uses: oil and polishing compound remover from glass. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemicals Specialities Div.

G-L ALKALI SOLID

Chemical properties: very highly alkaline cleaner in solid form; good soil suspending properties. Suggested uses: cleaning applications in food and citrus fruit industry. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialities Div.

GAFAC PE-510 (complex organic phosphate ester)

Sp.G., 1.081-1.086; Pour Pt.: 20 C; pH, 10% sol.: 1.5-2.5; Per cent active: 100. Solubility: in water and wide variety of polar and nonpolar solvents. Chemical properties: anionic detergent and emulsifier; outstanding stability in alkaline systems. Suggested uses: in light-duty household detergents; solvent cleaners; pesticide concentrates: emulsion polymerization; textile processing. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

GAFAC RE-610 (complex organic phosphate ester)

Sp.G., 1.095-1.115; Pour Pt.: <0° C; pH, 10% sol.: 1.5-2.5; Per cent active: 100. Solubility: in water and most polar solvents; partially soluble in nonpolar systems. Chemical properties: anionic detergent and emulsifier; outstanding stability in alkaline systems. Suggested uses: in industrial and household liquid and powdered alkaline cleaners; wall- and floor-cleaner concentrates; solvent cleaners; pesticide concentrates; textile processing; and emulsion polymerization. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

GALLIUM ARSENIDE (single crystal; polycrystalline)

GaAs. Mobility: 2,000 min.-4,700 cm^2 per volt-sec. Resistivity: 0.005-0.1 ohm-cm. Carriers: 5×10^{17} max.-2×10^{16} per cm^3; 5×10^{17}, max.-2×10^{16} per cm. Chemical properties: metallic appearance; free of cracks and holes. Suggested uses: semiconductor devices. Introduced as: significantly new grade; product with new degree of availability. Availability: commercial quantities. Monsanto Chem. Co., Inorganic Div.

GELVA EMULSION TS-100

Constituents: copolymer emulsion of vinyl acetate and a long chain acrylate. Bulk density: 8.9 lbs./gal. Chemical properties: deposits a clear, relatively soft, non-reemulsifiable film; excellent low-temp. flexibility; good adhesion to a variety of surfaces such as glass, polyvinyl chloride, aluminum, and Mylar; exhibits borax tolerance, solvent tolerance, and good aging of bond. Suggested uses: laminating polyvinyl chloride to chipboard and plywood; aluminum foil to Kraft and boxboard; polystyrene film to paper; polyvinylidene chloride film to paper, and others. Introduced as: significantly new grade. Availability: commercial quantities. Shawinigan Resins Corp., Marketing Div.

GENETRON 1112A (dichlorodifluoroethylene)

$CCl_2=CF_2$. M.W., 132.93; M.P., −115 C; B.P., 19.0 C. Chemical properties: olefinic nature of compound provides an intermediate for the synthesis of new chemicals of potential value, i.e., ethers and cyclobutane derivatives can be prepared by additional reactions. Introduced as: new chemical product. Availability: commercial quantities. Allied Chemical Corp., General Chemical Div.

GENETRON 1132A (vinylidene fluoride)

$CH_2=CF_2$. M.W., 64.04; M.P., −144 C; B.P., −83 C. Chemical properties: new polymers can be prepared; other olefinic reactions can provide methods of synthesizing new chemicals, as may be exemplified by the preparation of ethers from alcohols by addition to compound. Introduced as: new chemical product. Availability: commercial quantities. Allied Chemical Corp., General Chemical Div.

GLUTARIC ANHYDRIDE (pentandioic acid anhydride)

$CH_2(CH_2CO)_2O$. M.W., 114.09 C.; Sp.G., apparent density of solid, 33.0 lb./cu.ft.; M.P., 56.5 C.; B.P., 148.50 C. at 12 mm Hg. Purity: 95.0% min. glutaric anhydride; Solubility: in benzene and toluene; highly soluble in water on complete hydrolysis. Chemical properties: relatively stable in molten state; hydrolyzes rapidly in water; forms soluble calcium and barium salts; can be handled in stainless steel or aluminum at temperatures up to 180 C. Suggested uses: synthesis of esters, polyesters, and amides for plasticizers, resins, lubricants and adhesives; for manufacture of dyes and pharmaceuticals. Introduced as: new chemical product. Availability: semicommercial quantities. Du Pont, Industries & Biochemicals Dept.

HALOX

Constituents: perchloryl fluoride (ClO_3F); chlorine trifluoride (ClF_3); mixtures custom blended. M.W., 102.5-92.5; Sp.G., 1.43-1.75; M.P., −82.7 C to −146 C; B.P., 12 C to −47 C. Purity: 98%. Chemical properties: high energy oxidizer. Suggested uses: storable oxidizers for rocket propulsion. Introduced as: new chemical product. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Research Products Development Div.

α,α'-2,3,5,6-HEXACHLORO-p-XYLENE

$C_8H_4Cl_6$. M.W., 312.86; M.P., 179-180 C; B.P., 220 C at 30 mm Hg; Color: white. Solubility: insoluble in water, aliphatic alcohols; soluble at 25 C: acetone 4%; benzene 12%; carbon tetrachloride 2%; tetrahydrofuran 11%. Chemical properties: crystalline solid. Two reactive chlorine groups. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

HEXADECYL ALCOHOL

$C_{16}H_{34}O$. M.W., 242.27; Sp.G., 0.8443 at 20/20 C; M.P., <60 F; B.P., 95-203 C at 50 mm. Purity: 98.0 wt. %; Hydroxyl No.: 228 mg KOH/g; Total Carbonyl No.: 1.14 mg. KOH/g.; Saponification No.: 1.37 mg KOH/g. Chemical properties: liquid branched chain, primary alcohol; carbinol group located in middle of long branched chain; made up of an array of isomeric structures. Suggested uses: detergents, surfactants, plasticizers, synthetic lubricants, petroleum additives; textile lubricants; cosmetics; non-ferrous metal cold-rolling extreme-pressure additives; durable resin-treated cotton softener; agricultural growth regulator; inks, rubber latex dipping. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development Mkt. Div.

HEXADECYL LINOLEATE

M.P., <−30 C; Saponification No.: 106; Acid No.: 0.8; Color: pale yellow; I.V., 72. Purity: 100%; Solubility: usual fat solvents. Chemical properties: highly unsaturated liquid wax; bland odor. Suggested uses: cosmetic emollient; lubricant; plasticizer; film forming constituent; chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Wilson-Martin, Div. Wilson & Co. Sales.

HEXAFLUOROPENTANEDIOL (2,2,3,3,4,4-hexafluoropentane diol)

$C_5H_6O_2F_6$. M.W., 212.1; M.P., 77-78 C; B.P., 100 C at 10 mm. Purity: min. 98%. Chemical properties: forms esters, polyesters, with anhydrides, acid chlorides; reacts with epoxides, isocyanates. Suggested uses: thermally stable diesters, polyesters; functional fluids for resins. Introduced as: new chemical product. Availability: laboratory quantities. Hooker Chemical Corp., Product Development Div.

HEXAMETHYLENIMINE (azacycloheptane, hexahydroazepine)

$C_6H_{13}N$. M.W., 99.17; Sp.G., 0.88; M.P.,

NEW CHEMICALS for INDUSTRY

−37 C; B.P., 138 C at 760 mm. Solubility: insoluble in cold water, methanol, benzene, common organic solvents. Suggested uses: chemical ingredient for pharmaceutical, veterinary, agricultural, rubber chemicals. Introduced as: new chemical product. Availability: laboratory quantities. Du Pont, Industrial & Biochems Dept.

HEXYL ALCOHOL

$C_6H_{13}OH$; Constituents: mixture of normal hexanol and methyl pentanols. M.W., 102.11; Sp.G., 0.820 at 20/20 C; B.P., 297-313 F; Hydroxyl No.: 547 mg KOH/g; Carbonyl No.: 0.1 mg KOH/g; R.I.: 1.4910 at N 20/D. Purity: 99.8 wt. %. Chemical properties: liquid branched chain, primary alcohol. Suggested uses: plasticizers; mineral flotation agents; lubricant additives; solvents and degreasing chemicals; leather and textile finishing agents; pharmaceuticals; cosmetics; perfumes; defoamers. Introduced as: new chemical product. Availability: commercial quantities. Enjay Chemical Co., Market Development.

HINAC

Constituents: modified chromate may include synthetic resin and pigments. Chemical properties: exceptional corrosion resistance to acids, alkalies, solvents and oxidizing agents; available in color range. Suggested uses: applicable to steel, aluminum, stainless, galvanized, copper, brass by roller, dip or spray. Introduced as: new chemical product. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

HIGH-PURITY ISOPRENE (2-methyl-1,3-butadiene)

C_5H_8. M.W., 68.06; Sp.G., 0.6806 at 20/4 C; M.P., −120 C; B.P., 34 C. Purity: 99.3 wt. %; Solubility: in water; ∞ alcohol; ∞ ether. Chemical properties: highly reactive five carbon diolefin; undergoes Diels-Alder reaction. Suggested uses: synthetic rubbers; polymers; maleic anhydride; adducts; resins; chemical intermediates. Introduced as: significantly new grade. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

HI-TEMP GEON VINYL (polyvinyl dichloride)

Sp.G., 1.50. Solubility: in tetrahydrofuran, dimethyl formamide. Chemical properties: withstands temperatures 60 F higher than other vinyls; tensile strength reaches above 2,000 psi at 212 F; deformation at 264 psi occurs only at temperatures over 215 F; high modulus, impact strength, chemical resistance. Suggested uses: for process piping; tanks; ductwork; hot and cold water lines; valves; tank linings; other heat resistant applications. Introduced as: new chemical product. Availability: semicommercial quantities. B. F. Goodrich Chemical Co.

HYAMINE 1450 (n-tetradecyl dimethyl benzyl ammonium chloride carbamide)

M.W., 368; Density: 0.4 gr./cc; M.P., 120-130 C; Color: white. Purity: 50%; Solubility: in water, lower alcohols; insoluble in aromatic hydrocarbons. Chemical properties: nondusty, odorless, free-flowing powder. Suggested uses: germicide concentrate for powdered formulations and tablets. Introduced as: new chemical product. Availability: commercial quantities. Rohm & Haas.

HYBASE M-300 (magnesium overbased magnesium sulfonate)

Constituents: Mg salt of sulfonic acid overbased with Mg Co_3. Flash Pt.: 400 F; B.P., 1.1 at 60 F; 300 base number; 7.3% magnesium; Per cent active: 30. Solubility: in oil. Chemical properties: first commercially available Mg sulfanate with a 10:1 base number to activity. Suggested uses: in lube oil additives for crankcase oils, cylinder lubes for diesels, with high degree of acid neutralizing power. Introduced as: new chemical product. Availability: commercial quantities. Bryton Chemical Co.

HYCAR 1000X145 (carboxy-modified polybutadiene polymer)

Viscosity: Mooney, 4' at 212, 50-60 ML. Chemical properties: excellent low-temperature properties; ozone resistance; abrasion resistance; good electrical properties. Suggested uses: wire insulation or cable jacket; shoe soles. Introduced as: new chemical product. Availability: commercial quantities. B. F. Goodrich Chemical Co., Hycar Sales Div.

HYCAR 1872 (latex of carboxy-modified butadiene acrylonitrile polymer)

Constituents: contains no soap; total solids 40% pH, min. 8.5; Particle size: 1500-2000 A; Polymer Mooney: (ML-4 at 212 F.) 130-170. Chemical properties: unique emulsifier system; excellent chemical stability; excellent mechanical stability; min. foaming tendencies. Suggested uses: wet-end addition for making gaskets; binder for clay coatings. Introduced as: new chemical product. Availability: commercial quantities. B. F. Goodrich Chemical Co., Hycar Sales Div.

HYCAR 2570X1 (latex of carboxy-modified butadiene, styrene polymer)

Constituents: total solids 55%; pH, min. 6.5; Particle size: 3300 A; Carboxyl content (dphr): .033; Polymer Mooney viscosity; (ML-4 at 212 F) 60. Chemical properties: can be cured by use of zinc oxide alone as well as by conventional means; good color after heat and light aging; higher film strength than regular SBR latices; good properties for rug backing and pigment binding. Suggested uses: paper saturant. Introduced as: new chemical product. Availability: commercial quantities. B. F. Goodrich Chemical Co., Hycar Sales Div.

HYCAR 2671 (latex of polyacrylic polymer)

Constituents: total solids 50%. Sp.G., 1.06 (of latex); pH, min. 5.8; Polymer Viscosity: (ML-4 at 212 F) 98. Chemical properties: outstanding strength characteristics in paper and textiles; high resistance to discoloration from heat and light. Suggested uses: paper saturation; clay coatings for paper; wet-end addition to paper; non-woven textile binder; leather finishes; adhesives. Introduced as: new chemical product. Availability: commercial quantities. B. F. Goodrich Chemical Co., Hycar Sales Div.

HYDROQUINONE NITRODIBUTYL ETHER (1-nitro-2,5-di-n-butoxybenzene)

$C_{14}H_{21}NO_4$. M.W., 267.4; Color: clear amber. Purity: 95%. Chemical properties: liquid. Suggested uses: as intermediate in the synthesis of organic compounds, dyestuffs, pharmaceuticals, photographic chemicals, etc. Introduced as: new chemical product. Availability: laboratory quantities. Eastern Chemical Corp., Market Development Div.

HYDROQUINONE NITRODIETHYL ETHER (1-nitro-2,5-diethoxybenzene)

$C_{10}N_{13}NO_4$. M.W., 211.2; M.P., 49-51 C; Yellowish crystalline substance. Purity: 98%. Suggested uses: as intermediate in the synthesis of organic compounds, dyestuffs, pharmaceuticals, photographic chemicals, etc. Introduced as: new chemical product. Availability: laboratory quantities. Eastern Chemical Corp., Market Development Div.

HYDROQUINONE NITRODIMETHYL ETHER (1-nitro-2,5-dimethoxybenzene)

$C_8H_9NO_4$. M.W., 183.1; M.P., 70-72 C; Purity: 98%. Suggested uses: as intermediate in the synthesis of organic compounds, dyestuffs, pharmaceuticals, photographic chemicals, etc. Introduced as: new chemical product. Availability: laboratory quantities. Eastern Chemical Corp., Market Development Div.

m-HYDROXYBENZOIC ACID

$C_7H_6O_3$. M.W., 138.12; M.P., 200 C; Color: white. Purity: 99% +; Solubility: in water. Chemical properties: powder; reactive hydroxyl and carboxyl groups. Suggested uses: intermediate for plasticizers, resins, light stabilizers, petroleum additives, pharmaceuticals. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals & Dye Stuffs Div.

HYDROXYLAMINE-O-SULFONIC ACID

NH_2OSO_3H. M.W., 113.1. Purity: 95% +; Solubility: in water with slow hydrolysis. Chemical properties: hygroscopic solid; reacts with aldehydes, ketones and alcohols; amines are converted to substituted hydrazines. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., Baker & Adamson Div.

N-HYDROXYMETHYL PHTHALIMIDE

$C_6H_4(CO)_2NCH_2OH$. M.W., 177; M.P., 146-148 C; Color: white; Solubility: slightly soluble in acetone and water. Chemical properties: crystalline solid; mild, sweet odor; reacts with aromatic amines, hydro-halogen acids, acid chlorides, and nitriles. Suggested uses: plasticizer for thermosetting resins; microbiocides; photographic emulsion hardener; cotton dyes. Introduced as: new chemical product. Availability: laboratory quantities. Stauffer Chemical Co., Market Development Dept.

4-HYDROXYPYRIMIDINE

$C_4H_4N_2O$. Purity: reagent grade. Suggested uses: intermediate for Pyrimidine synthesis in cancer research program. Introduced as: new chemical product. Availability: laboratory quantities. Krishell Laboratories, Inc.

ICC 4 (IGNITION CONTROL COMPOUND NO. 4) (trimethyl phosphate)

$(CH_3O)_3PO$. M.W., 140; Sp.G., 1.218; B.P., 193 C; Phosphorus content: 22.1%. Purity: 98.6; Solubility: in water; 8.1 volume % in gasoline at 68 F. Chemical properties: low cost-highly effective deposit modifier. Suggested uses: as gasoline additive; plasticizer; flame retardant; chemical intermediate; solvents for paints, lacquers, inks, dyes, and certain plastic resins. Introduced as: product with new degree of availability. Availability: commercial quantities. Ethyl Corp.

INDENE OXIDE

C_9H_8O. M.W., 132; M.P., 24-30 C; B.P., 90-3 C at 5 mm. Solubility: in hydrocarbons. Suggested uses: chemical specialty and pharmaceutical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Neville Chemical Co.

INDIUM ACETYLACETONATE

$In(C_5H_7O_2)_3$. M.W., 412.15; M.P., 186 C. Suggested uses: catalyst. Introduced as: new chemical product. Availability: semicommercial quantities. MacKenzie Chemical Works, Inc.

INDIUM ARSENIDE (polycrystalline)

InAs. Mobility: 23,000 cm^2 per volt-sec. min.; Resistivity: 0.006 to 0.1 ohm-cm; Carriers: 3-5 x 10^{16} per cm^3. Hall Coefficient: −140 to −250 cm^3 per coulomb. Chemical properties: polycrystalline; metallic appearance; free of cracks and holes. Suggested uses: semiconductor devices. Introduced as: significantly new grade; product with new degree of availability. Availability: commercial quantities. Monsanto Chemical Co., Inorganic Div.

INDIUM PHOSPHIDE (polycrystalline)

InP. Mobility: 4,000 cm^2 per volt-sec.; Resistivity: 0.15 ohm-cm.; Hall Coefficient: —650 cm^3 per coulomb; Lifetime: 0.5 x 10^{-6} sec. Chemical properties: polycrystalline; metallic appearance. Suggested uses: semiconductor devices. Introduced as: significantly new grade; product with new degree of availability. Availability: semicommercial quantities. Monsanto Chemical Co., Inorganic Div.

INTEXSAN SB-85 (stearyl dimethyl benzyl ammonium chloride)

$C_{27}H_{50}NCl$. M.W., 423; Sp.G., 0.844 at 60 C; M.P., 40-45 C. Purity: technical grade; Solubility: 1-2 grams per 100 ml. water. Chemical properties: waxy solid; surface-activity. Suggested uses: hair softener and conditioner; dye fixitive. Introduced as: significantly new grade. Availability: commercial quantities. Intex Chemical Corp.

INULIN

$(C_6H_{10}O_5)_n \cdot xH_2O$. M.W., approx. 500; M.P., 182 C; Color: white. Purity: 99/100%; Solubility: 50 gr. in 100 ml. of boiling water. Chemical properties: odorless; crystalline. Suggested uses: in dietetic foods for diabetics; as diagnostic clinical reagent for kidney function tests. Introduced as: product with new degree of availability. Availability: commercial quantities. Eastern Chemical Corp., Market Development.

IOKEL

Constituents: phosphoric acid solution of a polyoxy ethanol alkyl phenol condensate complex of elemental iodine. Solubility: miscible in all proportions with water. Chemical properties: viscous dark liquid with acidic reaction. Suggested uses: detergent sanitizer; milk stone remover. Introduced as: new chemical product. Availability: commercial quantities. Diamond Alkali Co., Soda Products Div.

ISOBUTYLENE OXIDE (1,2-epoxy-isobutane)

C_4H_8O. M.W., 72; Sp.G., 0.831; B.P., 52 C. Purity: 97-99%; Solubility: in most organic solvents; insoluble in water. Suggested uses: research and development. Introduced as: new chemical product. Availability: laboratory quantities. Gallard-Schlesinger Chemical Mfg. Corp.

ISODECALDEHYDE

$C_{10}H_{20}O$. M.W., 156.26; Sp.G., 0.7395 at 20/20 C; B.P., 370-426 F; Total Carbonyl No.: 311.7 mg KOH/g. Purity 76.3 wt. %. Chemical properties: mixture of isomeric dimethyl hexanals. Suggested uses: paint driers; intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

ISODIHYDRO LAVANDULYL ACETATE

$C_{12}H_{21}O_2$. Sp.G., 0.881 at 25/25 C. Purity: 99%. Suggested uses: new ingredient for perfume compounds having a soft sweet floral character. Introduced as: new chemical product. Availability: commercial quantities. Fritzsche Brothers, Inc.

ISODIHYDRO LAVANDULYL ALCOHOL

$C_{10}H_{20}O$. M.W., 156; Sp.G., 0.847 at 25/25 C. Purity: 99.0%. Suggested uses: new ingredient for perfume compounds having a soft floral odor. Introduced as: new chemical product. Availability: commercial quantities. Fritzsche Brothers, Inc.

ISODIHYDRO LAVANDULYL ALDEHYDE

$C_{10}H_{18}O$. M.W., 154; Sp.G., 0.846 at 25/25 C. Purity: 95% min. Suggested uses: new ingredient for perfume compounds having a fruity, berry-like character. Introduced as: new chemical product. Availability: commercial quantities. Fritzsche Brothers, Inc.

ISOOCTALDEHYDE

$C_8H_{16}O$. Constituents: mixture of isomeric dimethyl hexanals. M.W., 118.21; Sp.G., 0.826 at 20/20 C; B.P., 215-225 F at 100 mm; R.I.: 1.4203 at N20/D. Purity: 95-98 wt. %. Suggested uses: paint driers; plasticizers; stabilizers; synthetic lubricants; lubricating greases; thickening agents; corrosion inhibitors. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

KARASAN 43 (octadecyl dimethyl benzyl ammonium chloride)

Sp.G., 0.9 at 20 C; Per cent active: 25%. Solubility: in water, alcohols and glycols. Suggested uses: softener for textiles; emulsifier for cationic polymers and latices; after rinse for hair shampoo; lubricant and release agent; antistatic compound. Introduced as: new chemical product. Availability: commercial quantities. Refined Products Company.

KARASOL 47 (ethoxylated fatty acid amide)

Per cent active: 97. Solubility: in water in all properties. Suggested uses: dispersant and suspending agent for dyes, pigments, clays, etc.; solubilizes and emulsifies fats and oils; acts as antidusting and non-caking assistant. Introduced as: new chemical product. Availability: commercial quantities. Refined Products.

KER 357A; 737A; 955A; 997A (epoxy o-cresol novolak resin)

Constituents: oxirane-oxygen content 7.2-7.6; 7.0-7.4; 4.8-5.2; 6.6-7.0%; total chlorine 0.5%. M.W., approx. 540; 1080; 850; 1270; Sp.G., 1.12; 1.16; 1.20; 1.19 at 25/4 C; M.P., 35; 73; 95; 99 C Durrans; Epoxide functionality: 2.7; 4.8; 2.7; 5.4; Epoxide equivalent wt.: 200; 225; 315; 235; Esterification equivalent wt.: 90 (955A 140). Chemical properties: provides high strength laminates with good high temperature resistance. Suggested uses: laminates, surface coatings, adhesives, thermoset castings. Introduced as: new chemical product. Availability. semicommercial quantities. Koppers Company, Inc., Tar Products Div.

KOLPHOS (tributyl phosphorotrithioite)

$C_{12}H_{27}S_3P$. Constituents: 10% min. phosphorus. M.W., 298; Sp.G., 25/15 C. 1.006 ±0.003; B.P., b_{15} 174-180 C. Purity: 95.0%; Solubility: in benzene, toluene etc. Suggested uses: ingredient in cotton defoliant. Introduced as: new chemical product. Availability: commercial quantities. Kolker Chemical Corp.

KYNAR (vinylidene fluoride polymer)

$(CH_2{=}CF_2)_n$. Sp.G., 1.76; M.P., 340 F (crystalline); Solubility: resistant to most corrosive chemicals and solvents. Chemical properties: bulk resin in powder and pellets; also solutions and dispersions; formable by all conventional fabricating methods; mechanically strong and tough; high degree of thermal stability; resistant to low temperature embrittlement; stable to strong UV and Gamma radiation and to extreme conditions of weather; does not maintain combustion. Suggested uses: shapes films and coating for equipment parts for chemical and food processing, packaging applications, insulation and protective coatings, etc. Introduced as: new chemical product. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Research Products.

KYRL 18 (hexadecyl stearate)

MW., high; MP., —26 C; Acid No.: 0.1; Saponification No.: 114; I.V.: 0.8. Purity: 100%; Solubility: in isopropanol, hexane, benzol, chlorinated solvents, acetone. Chemical properties: liquid wax, very limpid; absorbed readily by skin. Suggested uses: in cosmetics; pharmaceuticals; textile lubricants; metal rolling lubricants; anti-blocking agents. Introduced as: new chemical product. Availability: laboratory quantities. Wilson-Martin Div., Wilson & Co., Sales Div.

LD-213 (urethane polymer)

Sp.G., 1.15, at 75 F; M.P., viscous liquid at room temp.; Purity: 100% solids. Chemical properties: cured by reaction with polyfunctional materials containing active hydrogen to yield very hard, strong elastic products. Suggested uses: industrial cast and molded items, i.e., rolls, rollers, solid tires, heel lifts. Introduced as: significantly new grade. Availability: semi-commercial quantities. Du Pont, Elastomer Chemicals Dept.

LACTONITRILE (2-hydroxypropanenitrile)

C_3H_5NO. M.W., 71.08; M.P., —34 ±1 C; B.P., 103 C at 50 mm Hg; Density: $d_{25} = 0.9834$; Purity: assay 95% min.; Solubility: miscible with water, acetone, ethanol, benzene, ethyl ether, nitrobenzene, and aniline; less than 1% soluble in carbon tetrachloride, carbon disulfide, heptane, and petroleum ether. Chemical properties: undergoes reactions of a nitrile, such as hydrolysis, alcoholysis, reduction, reaction with Grignard reagents and the Houben-Hoesch synthesis; the hydroxyl group also shows its typical reactions: ammonolysis, acylation, dehydration, and reactions with diazomethane. Suggested uses: selective solvent; as chemical intermediate for surface active chemicals, plasticizing agents, filler for nitrile-containing plastic materials. Introduced as: new chemical product. Availability: semicommercial quantities. American Cyanamid Co., Organic Chemicals Div.

LAMINATING LATEX #65-13801

Constituents: tackified synthetic rubber latex. Chemical properties: excellent adhesive for polyethylene to kraft paper. Suggested uses: bag seam adhesive; laminating agent. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley Co., Chemical Div.

LANOSAN

Constituents: blend of fatty ester and lanolin. Solubility: in warm water. Chemical properties: maximum surface lubrication; anionic charge. Suggested uses: textile softener; lubricant. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

LECTRO 60 XL (modified lead chlorosilicate complex)

Sp.G., 3.7; Color: white. Purity: high. Chemical properties: fine powder; improved heat stability; increased insulation resistance; improved physical and mechanical properties; excellent processing characteristics; high order of stabilizing action with sensitive plasticizers. Suggested uses: special electrical grade stabilizer for vinyl electrical stocks in the U. L. Classification of 60 C. insulation; co-stabilizer with more basic lead compounds for higher temperature insulation. Introduced as: significantly new grade. Availability: commercial quantities. National Lead Co.

LITHIUM ALUMINUM TRI-TERT.-BUTOXY HYDRIDE

Li Al [tert-$OC_4H_9]_3$ H. M.W., 254; Sp.G., 1.03 g/cc; M.P., above 400 C; B.P., 280 C in vacuo; Purity: min. 90%; Solubility: in diglyme; tetrahydrofuran. Chemical properties: stereospecific, selective reducing agent. Suggested uses: in reduction of acid chlorides to aldehydes; stereospecific reduction of steroids. Introduced as: new chemical product. Availability: laboratory quantities. Metal Hydrides, Inc., Chemical Div.

LITHIUM DISPERSION IN PARAFFIN WAX

Constituents: lithium metal (average particle size of 10-20 microns) dispersed in solid paraffin wax, containing 30 wt. % of metal. Introduced as: new chemical product. Availability: commercial quantities. Lithium Corp. of America.

LITHIUM HYDROXIDE, ATOMIC WEIGHT SPECIFIED

LiOH containing lithium of atomic wt. 7.937 0.002. Chemical properties: contains nature or virgin lithium; atomic weight determined by mass spectrographic method. Suggested uses: preparation of lithium compounds needing an accurate value of the atomic weight of the lithium. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

LITHIUM PERBORATE

$LiBO_3 \cdot H_2O$. M.W., 83.78; Purity: 18-19% active oxygen; Solubility: 2.0 wt. % at 20 C. Chemical properties: high active oxygen content compared with sodium perborate; thermal decomposition begins at 160 C. Suggested uses: mild oxidant of high capacity. Introduced as: new chemical product. Availability: laboratory quantities. Lithium Corp. of America, Inc.

LITHIUM PEROXIDE

Li_2O_2. M.W., 45.88; Sp.G., 2.4; Purity: 30-32% active oxygen. Chemical properties: thermal decomposition energetic at 355 C; reacts with CO_2 to liberate oxygen. Suggested uses: atmosphere regenerant; high capacity oxidant. Introduced as: new chemical product. Availability: laboratory quantities. Lithium Corp. of America, Inc.

MGK REPELLENT 55 (tert-butylsulfenyldimethyldithiocarbamate)

$C_3H_6CSSCNC_2H_6$. M.P., 70-72 C; Purity: 98%; Solubility: very soluble in acetone, benzene, xylene, heavy aromatic naphtha, ethylene dichloride, methylene chloride; slightly soluble in low molecular weight hydrocarbons; insoluble in water. Suggested uses: in preparations to repel roaches and rats from specific areas. Introduced as: new chemical product. Availability: semicommercial quantities. McLaughlin Gormley King Co., Chemical Div.

MGK REPELLENT 1207 (3-chloropropyl-n-octyl sulfoxide)

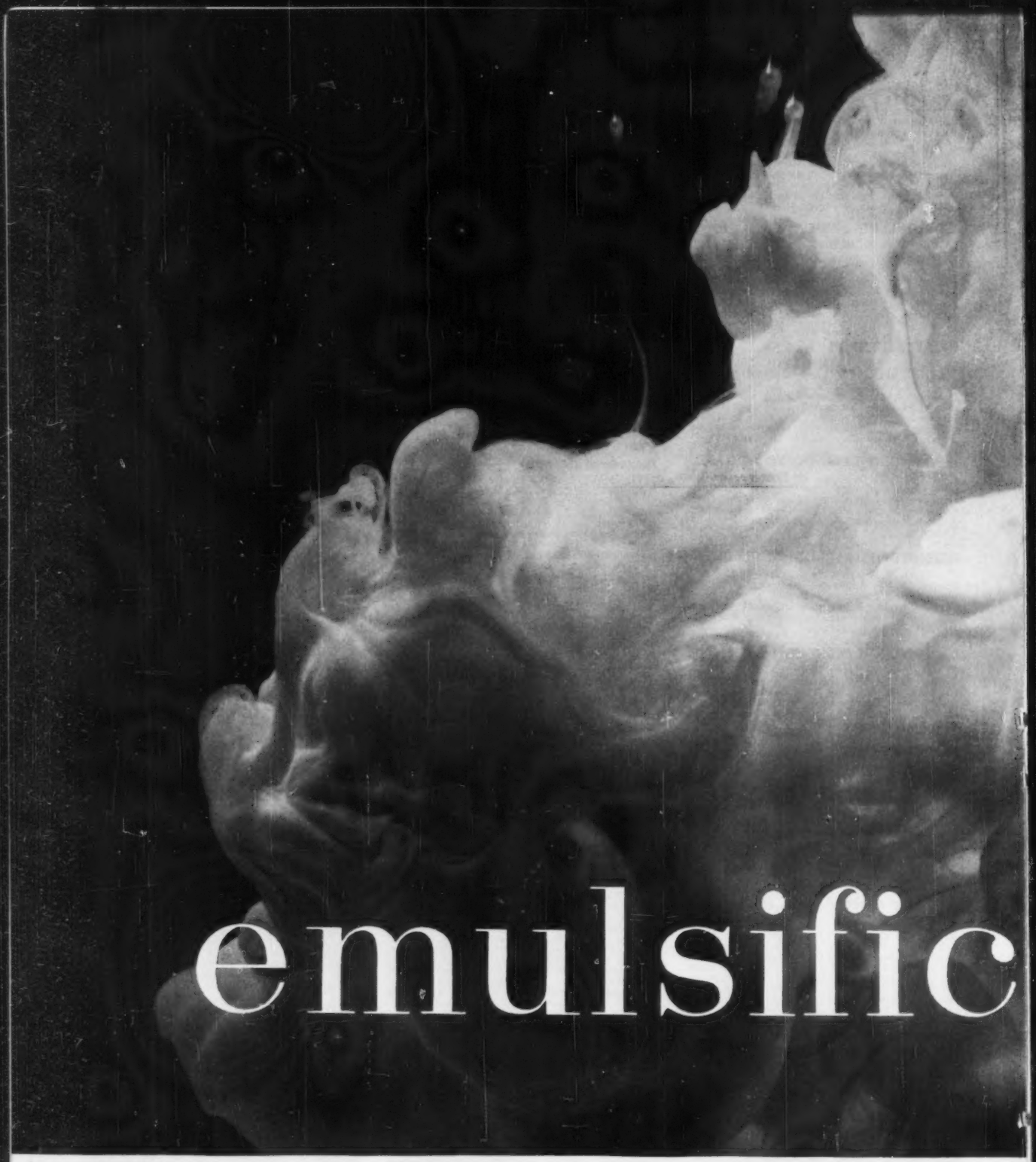
M.W., 237.64; Density: g/ml at 25 C, 1.10; M.P., 37-39 C; 1.4746 nD at 50 C; Solubility: in xylene. Suggested uses: as repellent in cattle sprays. Introduced as: new chemical product. Availability: laboratory quantities. McLaughlin Gormley King Co., Chemical Div.

MLA 250; 500; 750

Constituents: 1 methyl, 3 ethyl groups; 2 methyl, 2 ethyl groups; 3 methyl, 1 ethyl groups; all to 1 lead. M.W., 309.43; Solubility: in gasoline. Suggested uses: gasoline antiknock compound. Introduced as: new chemical product. Availability: commercial quantities. Ethyl Corp., Sales Div.

MAGNESIUM FLUORIDE, I.R. GRADE

MgF_2. Sp.G., 3.18; M.P., 1396 C; Purity: 99.9%. Chemical properties: very high purity grade of MgF_2 having low absorption and scattering characteristics of energy in the infrared range, especially in the 2-6 Micron range. Suggested uses: fabrication of infra-red transmission windows. Introduced as: significantly new



Picture shows "Bloom"—spontaneous emulsion of oil and emulsifier in water.

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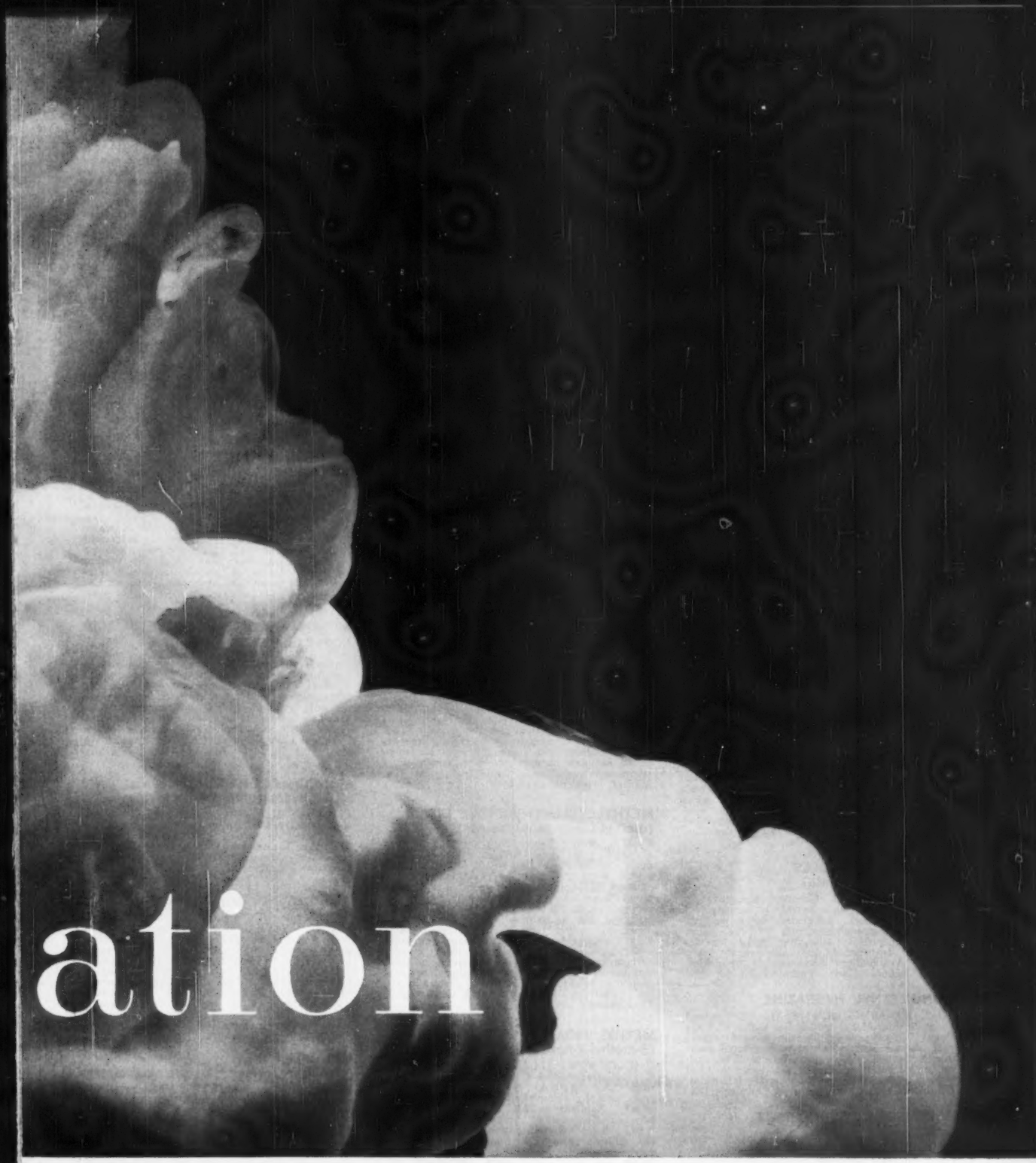


of non-ionic surface active agents:
Write Dept. M for information.

ATLAS
POWDER COMPANY
Wilmington 99, Delaware

grade. Availability: semicommercial quantities. Kawecki Chemical Co.

MAGNESIUM PERCHLORATE, ANHYDROUS, INDICATING

$Mg(ClO_4)_2$. Constituents: $Mg(ClO_4)_2$ +1% $KMnO_4$. Mesh: 10-20, saturated with carbon dioxide. Chemical properties: color changes from pink to brown on absorption of water. Suggested uses: dehydrating agent. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

MAGNESIUM PETRONATE

Constituents: a solution of 40% magnesium petroleum sulfonates in petroleum oil. Solubility: in oil and solvent. Chemical properties: dark liquid. Suggested uses: additive for lubricating oil. Introduced as: new chemical product. Availability: laboratory quantities. Sonneborn Chemical & Refining Corp., Industrial Research Dept.

MALEIC ANHYDRIDE/VINYL STEARATE COPOLYMER, 25 WT. %

Solubility: in many organic solvents. Chemical properties: esters can be prepared by reacting it with a suitable glycol or alcohol. Suggested uses: alkyd resins; cosmetic formulations; leather finishes; lube oil additives; paper coatings; polishes; mold release agent for polyester resins; polymeric plasticizer; textile finishing. Introduced as: new chemical product. Availability: laboratory quantities. Air Reduction Chemical Co.

MALEIC ANHYDRIDE/VINYL STEARATE, 7½ WT. %

M.W., 1,000-2,000; M.P., 45 C; Solution viscosity: 50% sol. in mineral spirits, 115 cps.; Melt viscosity: 90 C, 8,000 cps. Solubility: in many organic solvents. Chemical properties: esters can be prepared by reacting it with a suitable glycol or alcohol; can be emulsified. Suggested uses: alkyd resins; cosmetic formulations; leather finishes; lube oil additives; paper coatings; polishes; mold release agent for polyester resins; polymeric plasticizer; textile finishing. Introduced as: new chemical product. Availability: laboratory quantities. Air Reduction Chemical Co.

MAPROLIX[LK] NEEDLES (sodium lauryl sulfate)

Per cent active: 82. Chemical properties: a non-dusting form; can be readily incorporated into dry powders. Suggested uses: wetting, dispersing, suspending agents for dye, paint, textile pigments; emulsifying agent for detergents. Introduced as: significantly new grade. Availability: commercial quantities. Onyx Chemical Corp., Technical Service Div.

MONOMETHYL HYDRAZINE

$CH_3N_2H_3$. M.W., 46.26; Sp.G., 0.874 g/cm³ D at 25 C; M.P., —52.4 C; B.P., 87.5 C; Purity: 99+%; Solubility: in alcohol, ether; very slightly soluble in water; Suggested uses: missile propellant, chemical intermediate, specialty solvent. Introduced as: new chemical product. Availability: commercial quantities. Olin Mathieson Chemical Corp., Chemicals Div.

MERCUROUS PERCHLORATE, HYDRATED

$HgClO_4 \cdot 4H_2O$. Purity: reagent grade. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

MESITYLENE (1,3,5-trimethylbenzene)

C_9H_{12}. M.W., 120.09; Sp.G., 0.869 at 60/60 F; M.P., —52.7 C; B.P., 164-167 C; Purity: 95.0 wt. %; Solubility: water, ether; slightly soluble alcohol. Chemical properties: oxidation yields trimesic acid. Suggested uses: alkyd coatings; plasticizers; lubricants; antioxidants; surfactants; dyes. Introduced as new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

METHACRYL CHLORIDE, CRUDE

Constituents: primarily methacryl chloride, with small amounts of methacrylic anhydride and polymer. Introduced as: new chemical product. Availability: commercial quantities. J. T. Baker Chemical Co.

METHACRYL CHLORIDE, DISTILLED

B.P., 95-96 C; R.I.: 1.4420. Purity; distilled; Solubility: hydrolyzes in water. Chemical properties: a corrosive liquid; unstable to heat and probably light; will polymerize; powerful lachrymator; inhibited with quinone. Introduced as: new chemical product. Availability: commercial quantities. J. T. Baker Chemical Co.

METHOXY POLYETHYLENE GLYCOL 2000 (polyethylene glycol 2000 monomethyl ether)

$C_{91}H_{184}O_{46}$. M.W.,1850-2150; Viscosity: 32-39 centistokes at 210 F; Fr. Pt.: 49-51 C; Color: Pt-Co, 25 max., 25% aq. sol.; Ash: 0.1 wt. % max., pH, 5% water solution at 25 C, 4.5 min.-7.5 max. Solubility: completely miscible with water at temperatures above freezing range. Chemical properties: shows reactions of hydroxyl group. Suggested uses: textile lubricant. Introduced as: new chemical product. Availability: commercial quantities. Jefferson Chemical Co., Inc., Commercial Development Div.

3-METHYLBUTENE-1 (isopropylethylene; α-isoamylene)

C_5H_{10}. M.W., 70.08; Sp.G., 0.6272 at 20 C; M.P., —168.528 C; B.P., 20.061 C; Purity: 99.6 vol. %; Solubility: very soluble in alcohol, ether; insoluble water. Chemical properties: readily hydrated or oxonated to produce alcohols; alkylated with aromatics or phenols. Suggested uses: polymers; copolymers; chemical intermediates, plasticizers, additives, stabilizers, dyes, resins. Introduced as: significantly new grade. Availability: laboratory quantities. Enjay Chemical Co., Market Development Div.

METHYL CHLOROTHIOLFORMATE

CH_3SCOCl. M.W., 110.6; Sp.G., 1.276; B.P., 110 C; Flash Pt., 100 F; Color: slightly yellow. Solubility: miscible with aromatic and aliphatic hydrocarbons, acetone, and ethers. Chemical properties: liquid; reactive chemical intermediate. Suggested uses: to modify physical properties of compounds containing free hydroxyl, amino, and mercapto groups. Introduced as: new chemical product. Availability: laboratory quantities. Stauffer Chemical Co., Market Development Dept.

METHYLCYCLOPENTADIENE DIMER (methyl-1,3-cyclopentadiene)

$C_{12}H_{16}$. M.W., 160.25; Sp.G., 0.9341 at 20/4 C; B.P., 78-183 C ASTM; R.I., —1.4989 at N 20/D; Flash Pt.: —105 F; Viscosity: 3.5/68 F & 2.43/100 F centistokes. Purity: 94.0 wt. %; Solubility: very soluble in alcohol, ether, benzene; insoluble in water. Chemical properties: readily undergoes Diels-Alder reaction and can be oxidized, halogenated, epoxidized, and reduced; the methylene group reacts with metals, aldehydes and ketones. Suggested uses: high energy fuels; plasticizers; resins; surface coatings; perfumes; pharmaceuticals; stabilizers; dyes; additives. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development Div.

METHYL ISOAMYL KETONE (5-methyl-2-hexanone)

$C_7H_{14}O$. M.W., 114.2; Sp.G., 0.813 at 20/20 C; B.P., 141.6-147.4 C at 760 mm; Acid No.: 0.3; Color (APHA): 15 ppm.; Water Content: 0.1%; Nonvolatile, 0.005%. Purity: 97.5%; Solubility: 0.5% in water, 1.2% water in; Evaporation rate: 0.55; Flash Pt.: TOC 120 F; Toluene dilution ratio: 4.1; Naphtha dilution ratio: 1.2. Suggested uses: high solvency retarder solvent for acrylics, cellulose esters and vinyl copolymers. Introduced as: product with new degree of availability. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

2-4 METHYLMERCAPTOPHENOL

C_7H_8OS. M.W., 140.2; M.P. (4), 82 C; B.P., 110 C at 25 mm; 153-156 C, at 20 mm; Solubility: in common organic solvents; insoluble in water. Chemical properties: undergoes reactions typical of the phenolic group and the sulfide linkage. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., Baker & Adamson Div.

3-METHYLNORCAMPHANE-2-METHANOL

$C_9H_{16}O$. M.W., 140.2; Sp.G., 0.9812 at 20/20 C; B.P., 215 C at 760 mm; Flash Pt.: 205 F, COC; Color (APHA): 5ppm; Pour Pt.: —53 C. Purity: 95-97%; Solubility: miscible with benzene, acetone, ethanol (95%), and carbon tetrachloride; insoluble in water. Chemical properties: primary alcohol, readily esterifies with carboxylic acids. Suggested uses: chemical intermediate for plasticizers, synthetic lubricants, pharmaceuticals and synthetic perfumes. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemical Div.

METHYL PHOSPHORODICHLORIDATE

M.W., 149; Sp.G., 1.484 at 27/4; B.P., 44-45 C at 10 mm; n_{25} D: 1.4331. Purity: 99%; Solubility: in most inert organic solvents. Chemical properties: phosphorylating agent; undergoes the reactions typical of a reactive acid chloride. Suggested uses: phosphorylating agent; intermediate for organophosphorus compounds. Introduced as: new chemical product. Availability: laboratory quantities. Victor Chemical Works, Div. Stauffer Chemical Co.

m-METHYLTHIONILINE (m-[methylthio]aniline)

C_7H_9NS. M.W., 139.2; Sp.G., 1.140 at 25 C; F.P.: —3.0 C; B.P., 163-165 C at 16 mm; 101.5-102.5 C at 0.3 mm; Color: pale yellow. Purity: assay, 98-100%; Solubility: in benzene, alcohol, acetic acid; insoluble in water. Chemical properties: an oil; forms salts with HCl and acetic acid. Suggested uses: pharmaceutical intermediate. Introduced as: product with new degree of availability. Availability: commercial quantities. American Cyanamid Co., Fine Chemicals Dept.

MONOCHLORODIFLUOROACETIC ACID

$CClF_2 \cdot COOH$. M.W., 130.49; F.P., 23 C; B.P., 122 C; Color: water white. Solubility: dissolves exothermically in water in which it is completely soluble; miscible with many organic solvents. Chemical properties: very strong acid. Suggested uses: catalyst for organic reactions, particularly esterifications and condensation reactions. Introduced as: new chemical product. Availability: semicommercial quantities. Allied Chemical Corp., General Chemical Product Development.

MONOCHLOROHYDROQUINONE (2,5-dihydroxychlorobenzene)

$C_6H_5O_2Cl$. M.W., 144.6; M.P., 100 C. Purity: commercial grade. Suggested uses: organic intermediate; developing agent in photography, dyestuffs. Introduced as: new chemical product. Availability: semicommercial quantities. Aceto Chemical Co., Inc., New Products Div.

MONOMETHYLAMINE-50%

CH_5N. M.W., 31.1; Sp.G., 0.874; B.P., 33 C at atm.; Water content: 50%. Solubility: wide variety of organic solvents. Chemical properties: vapor pressure: 9.0 lbs./in.² at 20 C., compared with 5.5 lbs./in.² for 40% solution. Suggested uses: conversion to: dithiocarbamates used in rubber vulcanization and agricultural fungicides; surface-active agents; dyestuffs; pharmaceuticals. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Special Products Dept.

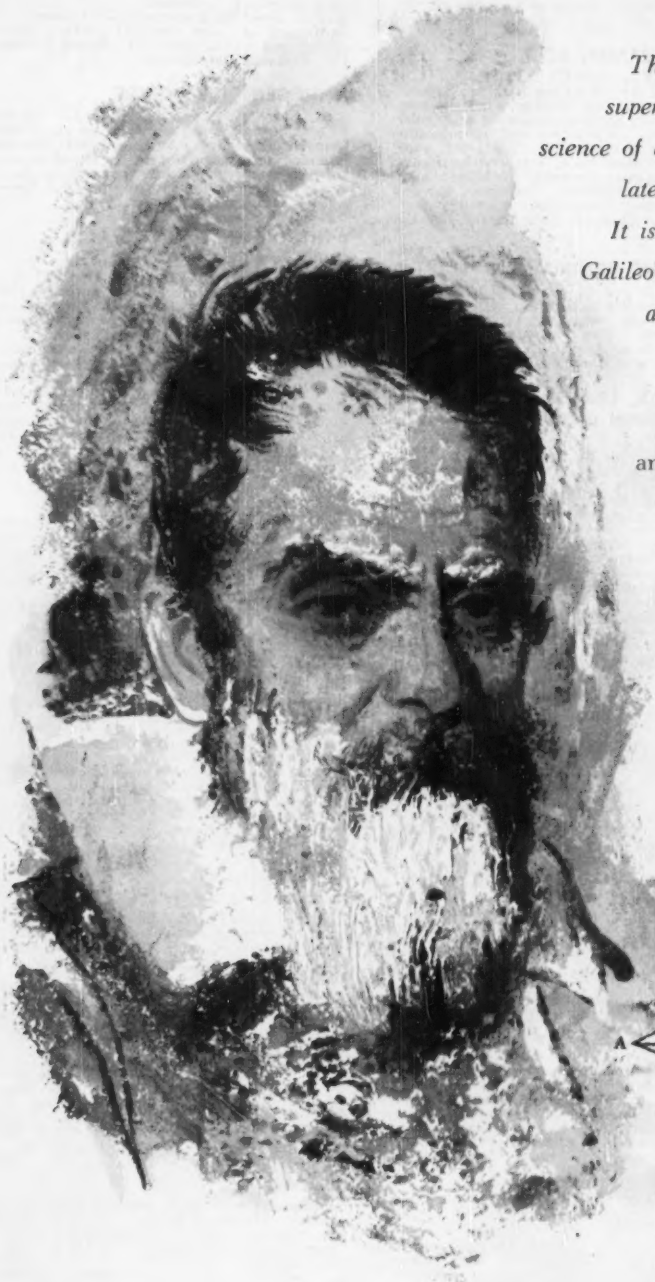
MONOPLEX S-74 (stabilizing low-temperature plasticizer)

Sp.G., 0.9160 at 25 C/15.5 C; Viscosity: 32-65 cps. at 25 C; Color (Varnish Scale): 1, clear. Chemical properties: heat and light stability. Suggested uses: automotive applications where "non-fogging" of windshields and good low temp. flexibility are required; instrument panel covers, upholstery, door panels, head liners, vinyl foam. Introduced as: new chemical product. Availability: commercial quantities. Rohm & Haas, Resinous Products Div.

MORPASOL (plastisol)

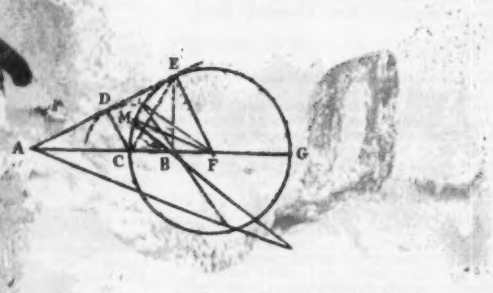
Constituents: polyvinyl chloride dispersions. Chemical properties: 100% solid material; quick fusing at low temperatures (280 F). Suggested uses: to laminate unsupported vinyl sheeting to various types of fabrics. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Plastisol Div.

THE QUALITY OF THINKING



The mind of Galileo—keenly analytical, superbly trained—led him to founding the science of experimental physics, which, centuries later, is revealing the mysteries of space. It is self-evident by his achievements that Galileo's mind reached a level of quality far above ordinary standards of excellence.

Within the same area of meaning, the quality of minds responsible for an engineering project can be evaluated only by results. When you check the record of Brown & Root's engineering through the years, the high quality of thinking reveals itself. Customer satisfaction from greater efficiency at lower costs has built a worldwide reputation for engineering and construction by Brown & Root.



"The knowledge of a single fact through a discovery of its causes prepares the mind to understand and ascertain other facts..."
Galileo

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NEW CHEMICALS for INDUSTRY

MULTI-SPERSE YELLOW PR 12-976, 978, 978 (chrome yellow pulps)

Constituents: 61-63% solids. Sp.G., 1.44; Color: wide range besides chrome yellow. Purity: commercial. Chemical properties: easy dispersion properties; outstanding compatibility; maximum stability; good alkali stability and light resistance; economical to use. Suggested uses: as stir-in pulp in all types of latex paints, including butadiene-styrene, polyvinyl acetate and acrylic. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

MYKON 454

Constituents: aqueous dispersion of a fatty amine condensate. pH (5% aqueous solution), 3.8 ± 0.2. Solubility: in all proportions in water; forms stable solutions in dilute electrolite solutions such as 5% sodium chloride solutions. Chemical properties: unique solubility in salt solutions. Suggested uses: as an all purpose textile softener; of particular value when application is from a salt solution in last rinse after dyeing. Introduced as: new chemical product. Availability: commercial quantities. Sun Chemical Corp., Warwick Div.

MYKON 463

Constituents: aqueous dispersion of fatty esters. pH (5% solution), 5.7 ± 0.2. Purity: 25%; Solubility: in water in all proportions. Chemical properties: true nonionic softener; excellent compatibility with resins and catalysts; non-yellowing, non-scorching, and non-chlorine retentive. Suggested uses: as a softener for all types of textiles; may be applied as top softener or in thermosetting resin bath itself. Introduced as: new chemical product. Availability: commercial quantities. Sun Chemical Corp., Warwick Div.

MYKON CL

Constituents: an aqueous dispersion of fatty amido compound. pH (5% solution), 4.2 ± 0.2. Purity: 25%; Solubility: in water in all proportions. Chemical properties: cationic textile softener; non-scorching, non-yellowing, non-chlorine retentive. Suggested uses: as a textile softener on all fibers; may be used alone or in conjunction with thermosetting resins. Introduced as: new chemical product. Availability: commercial quantities. Sun Chemical Corp., Warwick Div.

NAFIL SE-557

Chemical properties: flame retarding is accomplished by chemically reacting a phosphorus polyol into system; may be spray-applied. Suggested uses: building panels; radomes; thermal insulation. Introduced as: new chemical product. Availability: commercial quantities. Chase Chemical Corp.

NEODECANOIC ACID

Sp.G., 0.9110 at 20/4 C; B.P., 79-145 C at 10 mm; Acid No.: 311.5 mg KOH/g; Saponification No.: 335.9 mg KOH/g. Chemical properties: sterically hindered functional group; odorless: acid esterifies slowly and esters saponify with difficulty; esters transesterify. Suggested uses: plasticizers; synthetic lubricants; point driers; insect repellents; inks; rubber chemicals; thickening agents; corrosion inhibitors; lubricating greases; stabilizers; alkyd resins. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

NEOHEPTANOIC ACID (α-dimethylvaleric acid)

$C_7H_{14}O_2$. M.W., 130.18; Sp.G., 0.9165 at 20/4 C; B.P., 197-206 C; Acid No.: 435.5 mg KOH/g; Saponification No.: 434.1 mg KOH/g. Chemical properties: sterically hindered carboxyl group; practically odorless; remarkable stability of corresponding esters. Suggested uses: plasticizers; synthetic lubricants; paint drier. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

NEOPENTANOIC ACID (trimethylacetic acid)

$C_5H_{10}O_2$. M.W., 102.13; B.P., 157-168 C; Acid No.: 534.2 mg KOH/g; Saponification No.: 544.6 mg KOH/g. Chemical properties: crystalline aliphatic acid having a sterically hindered carboxylic acid group; slow rate of esterification or hydrolysis. Suggested uses: plasticizers, synthetic lubricants. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

NEOTRIDECANOIC ACID

Sp.G., 0.9032 at 20/4 C; B.P., 151-167 C at 10 mm; Acid No.: 255.3 mg KOH/g; Saponification No.: 260.1 mg KOH/g. Chemical properties: sterically hindered carboxylic acid; colorless, odorless; esterification and saponification slow; esters transesterify. Suggested uses: paint driers; plasticizers; synthetic lubricants; thickening agents; corrosion inhibitors; lubricating greases; stabilizers. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

NIAX FLAME RETARDANT A

Density, 25 lbs./cu. ft.; Color, white. Chemical properties: free-flowing powder. Suggested uses: improving flame retardant characteristics of rigid polyester foams. Introduced as: a new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

NIAX HEXOL LS-485 (hexafunctional propylene oxide derivative)

M.W., approx. 700; Hydroxyl No., 480 + 20 mg. KOH/g.; Volatility, 0.30% max.; Acid No., 0.10 mg. KOH/g. max.; Saponification No., 0.80 mg. KOH/g. max.; pH, 5.0-6.5 in 5% aqueous solution at 25 C. Chemical properties: provides high crosslinking density in rigid polyether foams. Suggested uses: as an intermediate in the preparation of various resins, emulsifiers, surface-active agents, pharmaceuticals, herbicides, fungicides, insecticides, adhesives, and plasticizers. Introduced as: a new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

NIAX PENTOL LA-475

Sp.G., 1.032 at 20 C; Viscosity: 19,000 cks. at 20 C; Pour Pt.; 35 F. Solubility: completely soluble in water, methanol, acetone, carbon tetrachloride, ethyl ether, and benzene. Suggested uses: intermediate for fast-rising, sprayable rigid polyether foams. Introduced as: a new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

NIAX PENTOL LA-700

M.W., 393; Volatility, 0.20% by wt., max.; Hydroxyl No., 665-735 mg. KOH/gm. polyol. Purity, 98%, total amine; Viscosity, 20,400 cps. at 100 F; Solubility: completely in water. Suggested uses: cross-linker in rigid polyurethane foams. Introduced as: a new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

NIAX TRIOL LM-52

M.W., 3,200. Chemical properties: exceptionally broad catalyst operating latitude in preparation of flexible polyester foams; provides wide range of foam properties with only minor formulation changes. Suggested uses: as a reactive polyglycol suitable for use as an intermediate for urethane polymers, including resilient foam elastomers and coatings; intermediate for mono- and di-esters of fatty acids used in insecticides, emulsifiers and petroleum emulsion breakers. Introduced as: a new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

NICHLOR 31 (nickel chloride)

$NiCl_2.4H_2O$; Color: lt. green. Chemical properties: non-caking coarse powder, high purity, uniform particle size, quick dissolving characteristics. Suggested uses: in electroplating and as source of catalytic nickel. Introduced as: new chemical product, significantly new grade. Availability: commercial quantities. The Harshaw Chemical Co., Plating Div.

NICKEL CITRATE (nickelous citrate)

Approx. $Ni_3(C_6H_5O_7)_2$. 14 H_2O. M.W., 806.57. Solubility: in water. Suggested uses: reagent chemical. Introduced as: new chemical product. Availability: laboratory quantities. City Chemical Corp.

p-NITROBENZYL CYANIDE (p-nitro-α-tolunitrile)

$C_8H_6N_2O_2$. M.W., 162.14; M.P., 116-118 C. Purity: 98% min.; Solubility: in alcohol and ether; insoluble in water. Chemical properties: nitro group is easily reduced to amino compound and undergoes usual reactions of this group; methylene hydrogens are also reactive. Suggested uses: intermediate for the production of pharmaceuticals; dyestuffs; sun screening agents; penicillin precursors; local anesthetics. Introduced as: new chemical product. Availability: commercial quantities. Benzol Products Co., Research Development.

NITROGEN TRIFLUORIDE

NF_3. M.W., 71.0; B.P., −129 C. Purity: 95%. Chemical properties: colorless gas in pure form; strong oxidizer. Suggested uses: chemical intermediate, oxidizer for use in liquid rockets. Introduced as: significantly new grade. Availability: laboratory quantities. Stauffer Chemical Co., Market Development Dept.

p-NITROPHENYL ACETIC ACID (p-nitro-α-toluic acid)

$C_8H_7O_4N$. M.W., 181.14; M.P., 154-157; Ash: 0.1% max.; Moisture: 0.1% max. Purity: 99% min.; Solubility: in alcohol and chloroform; slightly soluble in cold water. Chemical properties: nitro group may be reduced to the amino compound; also contains active methylene hydrogens and carboxyl group. Suggested uses: intermediate for production of pharmaceuticals, dyestuffs, sun screening agents; penicillin precursors; local anesthetics. Introduced as: new chemical product. Availability: commercial quantities. Benzol Products Co., Research & Development.

NOPALCOL 30-S (polyoxyethylene-fatty derivative)

Acid Value: < 2.0; Cloud Pt. (5% solution): > 100 C; pH, 5% sol. 8-9. Purity: commercial grade; Solubility: clear solution in water at 130-140 F. Chemical properties: waxy solid. Suggested uses: lubricant for starch in aerosol containers. Introduced as: new chemical product. Availability: commercial quantities. Nopco Chemical Co., Industrial Div.

ONCOR 23A (antimony silico oxide)

Constituents: inert silica core of low specific gravity, with a surface layer of antimony oxide fused to core. Sp.G., 3.6; Color: white. Purity; high. Chemical properties: powder; imparts flame resistance to halogen-containing resins; low and uniform tinting strength; excellent dispersion characteristics. Suggested uses: for all halogenated plastic and paint compositions requiring flame resistance. Introduced as: new chemical product. Availability: commercial quantities. National Lead Co.

ONYX RESIN O-5 (modified triazone resin)

Per cent active: 50. Solubility: unlimited. Chemical properties: high resistance to alkaline hydrolysis and chlorine retention; low amine odor potential. Suggested uses: wash and wear finishes on cotton. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

ONYXSAN FW-25%

Purity: 25%; Solubility: in water at room temp. Chemical properties: high resistance to acids; strong substantivity to textile fibers. Suggested uses: lubricant in acid fulling; softener; plasticizer for starches, glues, etc. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

OS-124

Constituents: mixture of isomeric bis(phenoxyphenoxy) benzenes. Sp.G., 1.2; B.P., 528 C (extrapolated); Viscosity: 363 cs at 100 F; Thermal stability (isotenescope): 847 F. Chemical properties: good thermal stability; oxidation resistance; lubricity; radiation resistance. Suggested uses: high temperature functional fluid and lubricant. Introduced as: new chemical product. Availability: semicommercial quantities. Monsanto Chemical Co., Organic Chemicals Div.

OXIRON 2000; 2001; 2002 (epoxy polyolefin)

Sp.G., 1.010; 1.014; 0.985; Epoxy equivalent: 177; 145; 232; % epoxy: 9.0; 11; 6.9; Viscosit at 25 C: 1800; 160; 15 poise. Chemical properties: has epoxy, hydroxyl and double bond functionality and can be crosslinked to a themoset by agents like amines, anhydrides and acids, and combination of anhydride-glycol. anhydride-peroxide and anhydride-glycol-peroxides to give high temperature properties. Suggested uses: adhesives; electrical potting, encapsulating, laminating; tooling, preprегs, casting;

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NEW CHEMICALS for INDUSTRY

coating. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Food Machinery & Chemical Corp., Epoxy Dept.

OXYTROL STARCH
(chemically modified corn starch)

App. B.O.D., 195,000 p.p.m.; Viscosity at 6.0% conc. and 188 F, 100 cps.; pH (10% conc.), 9. Purity: 99.5%. Chemical properties: low B.O.D. starch that provides greater weaving protection than regular starches. Suggested uses: textile warp-sizing starch for control of stream pollution. Introduced as: new chemical product. Availability: semicommercial quantities. A. E. Staley Mfg. Co., Industrial Sales Div.

P-1200 RESIN GRADE
(polypropylene glycol)

M.W., 1200 (average); Sp.G., 1.003 at 25 C; meets urethane resin grade specifications. Solubility: in water at 2 g./100 gs.; solvent 25 C. Suggested uses: urethane coating and elastomer intermediate. Introduced as: significantly new grade. Availability: semicommercial quantities. Dow Chemical Co.

PEN-GLO

Constituents: water base product containing sudsing and solubilizing ingredients combined with nonionic surfactant. Chemical properties: outstanding cleaning ability with improved sudsing and solubilizing properties. Suggested uses: neutral general purpose manual cleaner for farm dairy, home, institutional and food plant use. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

PENNSALT AE-17

Constituents: caustic soda with chelating agent. Chemical properties: uniform etching with prolonged effective bath life. Suggested uses: aluminum etching. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

PENNSALT CLEANER 65

Constituents: mild alkalies containing wetting and penetrating agents. Chemical properties: power spray type cleaner for metals which gives good performance at room temp. Suggested uses: general cleaner for use prior to phosphatizing. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

PENNSALT CLEANER 127

Constituents: alkaline silicate with water conditioner and surfactants. Chemical properties: low foaming spray type cleaner for ferrous metal surfaces. Suggested uses: for use prior to application of one-coat procelain enamel finish systems. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

PENNSALT CLEANER BC-51

Constituents: solvent with sequesterants. Chemical properties: liquid buffing compound remover. Suggested uses: cleaning aluminum and plating systems. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

PENNSALT CLEANER EC-70

Constituents: solvents; coupling agents; solubilizing agents; rust inhibitors. Chemical properties: high-flash stable solvent emulsion cleaner with rust inhibiting properties. Suggested uses: solvent emulsion cleaner for steel. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

PENNSALT CLEANER U-84

Constituents: caustic soda; water conditioning and wetting agents. Chemical properties: strong alkaline non-silicated heavy duty cleaner. Suggested uses: ultrasonic cleaning applications. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

PERCHLOROMETHYL MERCAPTAN
(trichloromethylsulfenyl chloride)

Cl_3CSCl; M.W., 185.9; Sp.G., 1.699; B.P., 68 C at 52 mm. Purity: 95% min.; Solubility: organic solvents. Chemical properties: reactive chemical intermediate. Suggested uses: preparation of insecticides; fungicides; oil and fuel additives; dye intermediates; etc. Introduced as: product with new degree of availability. Availability: commercial quantities. Stauffer Chemical Co., Market Development Dept.

PERFLUOROGLUTARYL CHLORIDE

$C_5O_2F_6Cl_2$; M.W., 276.95; B.P., 110-111 C. Purity: 98+%; Solubility: in CCl_4, benzene. Chemical properties: reacts with water, alcohols, glycols, amines. Suggested uses: intermediates, dyes, pharmaceuticals, resins, functional fluids. Introduced as: new chemical product. Availability: laboratory quantities. Hooker Chemical Corp., Product Development Div.

PERMAFRESH 197; 462

Constituents: dimethylol derivative of cyclic nitrogen compound. Purity: 45%; Solubility: miscible with water in all proportions. Chemical properties: extremely low level of odor in relation to the level of chlorine resistance obtainable; provides chlorine resistance at cost equal or lower than ordinary chlorine retentive finishes. Suggested uses: all-purpose wash and wear finish. Introduced as: new chemical product. Availability: commercial quantities. Sun Chemical Corp., Warwick Div.

PERMAFRESH 465
(methylol carbamide resin)

pH (undiluted), 8.1 ± 0.1. Purity: 30% nonvolatiles; Solubility: miscible with water in all proportions. Chemical properties: liquid thermosetting resin; easy to handle; highly effective; good storage stability, and at low temp. Suggested uses: for shrinkage control; crease resistance; wash and wear properties on cellulosic fabrics and blends. Introduced as: new chemical product. Availability: commercial quantities. Sun Chemical Corp., Warwick Div.

PERMAFRESH 474
(carbamide formaldehyde resin)

pH (undiluted), 8.4 ± 0.2. Purity: 50%; Solubility: miscible with water in all proportions. Chemical properties: extremely low free formaldehyde content; minimum odor in finishing plant and on treated cloth. Suggested uses: for shrinkage control; crease resistance; wash and wear properties; especially useful in finishing plants having poor ventilation, and where after-washing facilities on cloth are unsatisfactory. Introduced as: new chemical product. Availability: laboratory quantities. Sun Chemical Corp., Warwick Div.

PERMA KLEER 95

Sp.G., 1.2; pH, 8.8; Per cent active: 40. Purity: technical grade; Solubility: in water in all proportions. Chemical properties: high capacity iron and copper sequestrant for highly alkaline applications. Suggested uses: very effective in a caustic scouring operation where usually high concentrations of iron, copper, manganese are present. Introduced as: new chemical product. Availability: commerical quantities. Refined Products Co.

PERMA KLEER 312

Sp.G., 1.2; pH, 11.0; Per cent active: 25. Purity: technical grade; Solubility: in water in all proportions. Chemical properties: high capacity iron and copper sequestering agent; stable towards oxidizing agents over entire pH range. Suggested uses: chelation of iron and copper ions in hydrogen peroxide, sodium chlorite bleach formulations and other instances where such types of agents tend to be catalyzed by these metal ions. Introduced as: new chemical product. Availability: semicommercial quantities. Refined Products Co.

PERMANSA YELLOW L 12186; R 12185; RA 12187 (hansa yellows)

Sp.G., 12186—1.51; 12185—1.48; 12187—1.43. Purity: commercial. Chemical properties: excellent light resistance, superior to other Hansa Yellows. Suggested uses: for exterior yellow latex paints. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

PETROLITE C-8500 WAX
(emulsifiable microcrystalline wax)

M.P., 93/99 C; Color: 3 N.P.A. max.; Penetration: 5/7 N.P.A. at 77 F; Acid No.: 6.5/8.5; Saponification No.: 25/35. Chemical properties: can be emulsified with extremely small amount of oleic acid. Suggested uses: emulsion type floor polishes. Introduced as: significantly new grade. Availability: commercial quantities. Bareco Wax Co. Div., Petrolite Corp.

PETROMIX AS

Constituents: blend of non-ionic emulsifiers, homogenizers and coupling agents. Sp.G., 0.98 at 60 F; Saybolt Viscosity: 390/410 at 100 F; pH of 1% solution: 8.3; Cloud Pt.: < 25 F; Pour Pt.: < 25 F; Moisture: trace. Solubility: in oil and solvent. Suggested uses: antistatic agents; wherever non-ionic emulsifier is required. Introduced as: new chemical product. Availability: commerical quantities. Sonneborn Chemical & Refining Corp., Industrial Research Dept.

PETRONAUBA W WAX
(emulsifiable microcrystalline wax)

M.P., 84 C min.; Color: cream white; Penetration: 8 N.P.A. max. at 77 F; Acid No.: 22/30; Saponification No.: 45/55. Chemical properties: can be emulsified with small amounts of oleic acid. Suggested uses: emulsion type floor polishes. Introduced as: significantly new grade. Availability: commercial quantities: Bareco Wax Co. Div., Petrolite Corp.

PETROSENE A; B; C; D;

Solubility: in oil and solvent. Chemical properties: dark liquid. Suggested uses: fuel oil additive; (D) dispersant and corrosion inhibiting additive for residual fuels high in vanadium, sodium and sulfur. Introduced as: new chemical product. Availability: commercial quantities. Sonneborn Chemical & Refining Corp., Industrial Research Dept.

PETROTONE
(organophilic clay)

Chemical properties: free-flowing powder; suspending agent for oil emulsion drilling mud. Suggested uses: Additive for oil-base and water-in-oil emulsion oil-well drilling fluids to give suspension of formation and high density solids. Introduced as: new chemical product. Availability: commercial quantities. Baroid Div., National Lead Co.

p-PHENOXYSTYRENE

$C_{14}H_{12}O$. M.W., 196; B.P., 120-122 C at 1 mm. Purity 96-98%; Solubility: in ether and most organic solvents; insoluble in water. Chemical properties: vinyl derivative which undergoes polimerization. Suggested uses: monomer and co-monomer; plastic research; organic intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Gallard-Schlesinger Chemical Mfg. Corp.

PHENYL-2-PYRIDYL KETOXIME

$C_6H_5C(NOH)C_5H_4N$. Purity: reagent grade. Chemical properties: colorless crystals. Suggested uses: reagent for the spectrophotometric determination of iron in strong alkalies; a reagent for determining oxidized iron in the presence of metallic iron. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

PHENYL CHLOROTHIOLFORMATE

C_6H_5SCOCl. M.W., 172.6; Sp.G., 1.269; M.P., −14 C; B.P., 100-101 C; Flash Pt.: 240 F; Color: yellow. Solubility: miscible with aromatic and aliphatic hydrocarbons, acetone, ethers. Chemical properties: liquid; reactive chemical intermediate. Suggested uses: to modify physical properties of compounds containing free hydroxyl, amino, and mercapto groups. Introduced as: new chemical product. Availability: laboratory quantities. Stauffer Chemical Co., Market Development Dept.

PHOSGARD B-20

Constituents: chlorine 9%; bromine 42%; phosphorus 8%. M.W., 374 approx.; Sp.G., 1.78; B.P., 180-182 C at 0.1 mm Hg. Purity: 99%; Solubility: miscible with most solvents except water and aliphatic hydrocarbons. Chemical properties: low viscosity; compatible additive for polymers and synthetic fibers. Suggested uses: flame retardant additive for plastics, resins and synthetic fibers. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

PHOSGARD B-52-R

Constituents: chlorine 17%; bromine 45%; phosphorus 6%. Flame Pt.: 190 C; Pour Pt.: 25 F. Purity: 93%; Solubility: miscible with most solvents except water and aliphatic hydrocarbons. Suggested uses: flame retardant additive for plastics, resins and synthetic fibers.

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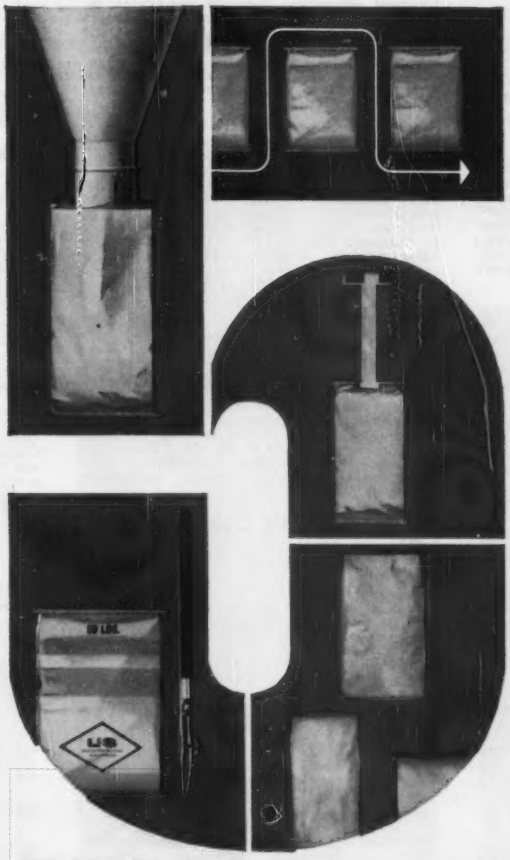

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Fourth is *specifications control*. This covers standardization of multiwall bag styles, elimination of unnecessary odd sizes and the freeing of valuable warehouse space.

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NEW CHEMICALS for INDUSTRY

Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

PHOSGARD C-22; 22-R

Constituents: chlorine 28; 27%; phosphorus 15%, M.W., 611 approx.; Sp.G., 1.41-1.43. Purity: 97-98%. Solubility: miscible with most solvents except water and aliphatic hydrocarbons. Suggested uses: flame retardent additive for plastics, resins and synthetic fibers. Introduced as: new chemical product. Availability: laboratory quantities. Monsanto Chemical Co., Organic Div.

PHOSPHOLEUM (105% polyphosphoric acid)

$H_3PO_4 \cdot P_2O_5$; Constituents: 58% ortho phosphoric acid; 38% pyrophosphoric acid; 3.5% tripolyphosphoric acid; traces of higher polymer acids. Sp.G., 1.92. Purity: industrial grade; Solubility: in water. Chemical properties: 76% P_2O_5 content; lower corrosion rates than orthophosphoric acid. Suggested uses: petroleum polymerization catalyst; dehydrating agent and/or catalyst in organic reactions; aluminum bright dip solutions. Introduced as: significantly new grade. Availability: commercial quantities. Monsanto Chem. Co., Inorganic Div.

PHOSPHONITRILIC CHLORIDES

$(PNCl_2)n$; Constituents: commercial mixture; trimer; trimer-tetramer mixture (75%:25%); low linear mixture (90+% cyclics). Solubility: cyclic polymers soluble in non-polar solvents; linear polymers soluble only in polar solvents. Chemical properties: the P-N ring in the cyclic polymer is very stable to chemical attack, making substitution of the CL atoms possible. Suggested uses; derivatives are of interest in high temperature applications such as in polymers, lubricants, textiles, etc. Introduced as: new chemical product. Availability: laboratory quantities. Hooker Chemical Corp., Product Development Div.

PIMELIC ACID (1,7-heptanedioic acid)

$HOOC(CH_2)_5COOH$ $C_7H_{12}O_4$. M.W., 160; Color (APHA): 20% in CH_3OH, 150 max.; M.P., 102-104 C; Water content: 0.05% max. by wt. Purity: 99% min. assay; Solubility: g./100 g. of total solution 50 at 50 C; water 5.0 at 20 C; toluene 0.34 at 60 C; heptane 0.015 at 60 C. Chemical properties: typical of the members of the dibasic acid series; formation of amides and dehydration to nitriles proceed normally; ester formation is also typically effected; when heated with acetic anhydride, however, a cyclic ketone forms with the attendant loss of carbon dioxide and water. Suggested uses: polyesters, polyamides, plasticizers, high pressure lubricants. Introduced as: new chemical product. Availability: semicommercial quantities. American Cyanamid, Organic Chemicals Div.

PIONEER #820 CORK INSULATION

Constituents: cork, asbestos and bituminous base mixture. Thermal insulation value (K): 0.36; BTU/hr/sq.ft/F/inch of thickness; Water vapor permeability rate: not over 0.1 grains per sq. ft. per hour for a ½" thickness. Chemical properties: protective coating provides excellent insulation and corrosion protection for metal surfaces; spray application. Suggested uses: insulates heated oil, chemical and other heated tanks and piping. Introduced as: significantly new grade. Availability: commercial quantities. Witco Chemical Co., Inc., Pioneer Products Div.

2-PIPERIDINOETHANOL (n-[2-hydroxyethyl]-piperidine)

$C_7H_{15}NO$. M.W., 129.20; Sp.G., 0.972-0.974 at 20/4 C; B.P., 115-117 C at 45 mm; R.I.: n20/D:1.478-1.480. Purity: 98% min.; Solubility: miscible in water and most organic solvents in all proportions. Chemical properties: behaves as a tertiary aliphatic amine and as an alcohol. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

PIPERYLENE (1,3-pentadiene)

C_5H_8. M.W., 68.114; Sp.G., 0.693 at 60/60 F; M.P., c −140.82, t −87.47 C; B.P., c −44.068, −42.032 C; R.I., c 1.43634, t 1.43008 N 20/D. Purity: 91.6 wt. %; Solubility: infinitely soluble in alcohol and ether; insoluble in water. Chemical properties: 5-carbon conjugated diolefin having cis and trans forms; undergoes Diels-Alder reaction. Suggested uses: synthetic rubbers; polymers; maleic anhydride adducts; resins; chemical intermediates. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

PLASTICIZER DP108

Sp.G., 0.930 at 100/4 C; Color (APHA): 50; Acidity (as acetic): 0.05; Pour Pt.: −50 C; Saponification No.: 290. Purity: 100%. Chemical properties: low temp. plasticizer similar to pelargonate esters. Suggested uses: low temp. flexibilizer; lubricant, hydraulic fluid; plasticizer for synthetic rubbers; nitro cellulose and polyvinyl chloride. Introduced as: new chemical product. Availability: laboratory quantities. Wilson-Martin, Sales Div. Wilson & Co.

PLASTICIZER T108

Sp.G., 0.962 at 100/4 C; Color (APHA): 100 max.; acidity (as acetic): 0.1% max.: Pour Pt.: −45 C; Saponification No.: 269-279. Purity: 100%. Chemical properties: excellent low temp. plasticizer competitive with caprylate and mixed caprate-caprylate esters; wide compatibility and permanence. Suggested uses: vinyls, natural and synthetic resins and rubbers; where low solidification is desirable. Introduced as: new chemical product. Availability: laboratory quantities. Wilson-Martin, Sales Div. Wilson & Co.

POLYISOBUTYLENE L-200; L-250; L-300

M.W., 200,000, 250,00, 300,000 Staudinger; Sp.G., 0.91 at 20/20 C. Chemical properties: high molecular weight. Suggested uses: wire and cable insulation; mechanical goods; roofing; irrigation ditch liner; adhesives; mastics; caulking compounds; rubber and plastic modifier. Introduced as: significantly new grade. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

PROPOQUAD C/12; HT/12 (propoxylated alkyl quaternary ammonium compounds)

$[RN(CH_3)(CH_2C(CH_3)OH)_2]^+ CH_3SO_4^-$. M.W., C/12 442; HT/12 510; Per cent quaternary: C/12 95 min.; HT/12 75 min. Solubility: in water and polar organic solvents; insoluble in hydrocarbon solvents. Chemical properties: surface active agent; good bacteriostatic and fungistatic properties; quaternary ammonium methylsulfates. Suggested uses: bacteriostatic and fungistatic agents. Introduced as: new chemical product. Availability: semicommercial quantities. Armour Industrial Chemical Co.

PROPOXYLATED AMINE C/12; C/25; HT/12, HT/25 (polypropoxylated alkylamines)

$RN(CH_2C(CH_3)O)_x H(CH_2C(CH_3)O)_y H$. M.W., C/12 316; C/25 1063; HT/12 384; HT/25 1128; moles combined propylene oxide: C/12 2; C/25 15; HT/12 2; HT/25 15; C/12, C/25 from coco amine; HT/12, HT/25 from hydrogenated tallow amine. Solubility: in common polar and nonpolar organic solvents; insoluble in water. Chemical properties: high molecular weight tert., amines; compounds can form salts of inorganic and organic acids. Suggested uses: preparation of surface active agents; bacteriostats; corrosion inhibitors; demulsifiers; defoaming agents. Introduced as: new chemical product. Availability: semicommercial quantities. Armour Industrial Chemical Co.

PROTEASE 41 (proteolytic enzyme)

Constituents: standardized with cornstarch. Standardized at 54,000 hemoglobin units/g. by the A.O.A.C. assay procedure. Purity: food grade; Solubility: in water. Chemical properties: high protease and low diastase activity. Suggested uses: in bread baking; beer chill-proofing; meat tenderizer; protein hydrolyzates; digestive aid; wherever the solubilization of protein is desired. Introduced as: significantly new grade. Availability: semicommercial quantities. Rohm & Haas, Special Products Dept.

PSEUDOCUMENE (1,2,4-trimethylbenzene)

C_9H_{12}. M.W., 120.09; Sp.G., 0.878 at 60/60 F; M.P., −57 C; B.P., 168-171 F. Purity: 95.0 wt. %; Solubility: in water. Chemical properties: oxidation yields trimellitic anhydride. Suggested uses: oil-soluble and water-soluble alkyd resins; unsaturated polyesters; plasticizers; epoxide resins; films; resins; dyes. Introduced as: new chemical product. Availability: semicommercial quantities. Enjay Chemical Co., Market Development.

4-PYRIDONE

C_4H_5ON. M.W., 87; M.P., 140-151 C. Purity: 98%. Suggested uses: organic intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Winthrop Laboratories, Special Chemicals Div.

QUINOLINIC ACID (2,3-pyridinedicarboxylic acid)

$C_7H_5O_4N$. M.W., 167.12; M.P., decarboxylates to niacin; Color: white. Purity: 99+; Solubility: in HCl, HNO_3, Aq. NaOH; slightly soluble in water, methanol, carbon tetrachloride, benzene and toluene. Chemical properties: typical dibasic acid, with the ring nitrogen exhibiting sufficient basic properties to allow formation of salts when reacted with strong acids. Suggested uses: dyes; pharmaceuticals, polyesters. Introduced as: new chemical product. Availability: laboratory quantities. Koppers Company, Inc., Tar Products Div.

REDICOTE T

Constituents: compounded aliphatic nitrogen chemicals. Sp.G., 0.9695; Viscosity: 1200 SSU (approx.) at 100 F; Pour Pt.: 50 F (approx.). Chemical properties: cationic melting agent for use in resinous and asphaltic materials. Suggested uses: asphalt tile; automobile undercoating; sound-deadening coatings; roofing and building paper; putty and caulking compounds. Introduced as: new chemical product. Availability: commercial quantities. Armour Industrial Chemical Co.

REGENT YELLOW PRIMROSE 12176; LIGHT 12177; MEDIUM 12178 (chrome yellow)

Sp.G., 12176: 5.75; 12177: 5.74; 12178: 5.42. Purity: commercial. Chemical properties: better light and alkali resistance than regular Chrome Yellows. Suggested uses: in paints for trade sales, automotive, farm equipment finishes and industrial enamels and lacquers; in vinyls, automotive or furniture upholstery. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

RESISTOR COMPOSITIONS

Constituents: specially treated metal powders in an organic vehicle. Suggested uses: resistors for fired application to ceramic sustrates. Introduced as: new chemical product. Availability: commercial quantities. Du Pont, Electrochemicals Dept.

α-RESORCYLIC ACID

$C_7H_6O_4$. M.W., 154.12; M.P., 237 C; Color: white. Purity: C.P.; Solubility: in water, ethanol, ether. Chemical properties: crystals; reactive carboxyl in hydroxyl groups. Suggested uses: intermediate for dyes; pharmaceuticals; light stabilizers; resins. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals & Dyestuffs Div.

RHOPLEX AC-201 (thermosetting acrylic aqueous emulsion)

Solids Content: 46 ± 1%; pH, 9.0-10.0; Wt./Gal.: approx. 9.1 lbs.; Color: milky; Bulking Values: emulsion 0.110 gals./lb., solid polymer 0.0985 gals./lb. Chemical properties: liquid; converts on baking to extremely hard, glossy film possessing exceptional water, chemical, and humidity resistance, adhesion and impact resistance; has characteristics of acrylic polymers, particularly excellent color and color retention, stability and durability. Suggested uses: top coats and primers for appliances, automobiles, steel drums, machinery, motors, metal furniture. Introduced as: new chemical product. Availability: commercial quantities. Rohm & Haas, Resinous Products Div.

RHOPLEX B-83 (modified acrylic copolymer emulsion)

Solids content: 38%. Chemical properties: excellent wear properties; gloss and color in formulations. Suggested uses: floor waxes and polishes. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Resinous Products Div.

BRIEFS

benzoyl chloride in carboys or carloads
phosphorus oxychloride as a chlorinating agent
liquid caustic soda—which strength is right for you

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Any quantity of this Hooker compound assays 99% pure benzoyl chloride on a hydrolyzable chlorine basis.

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It may pay you to look into this Hooker chemical if you're developing organic phosphates or plasticizers, gasoline additives, fire-resistant hydraulic fluids, or chlorinated products.

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Our representative can help you with further details. Just write our nearest Hooker sales office.

For more information on chemicals mentioned on this page, check here:

- ☐ Benzoyl Chloride Data Sheet
- ☐ Caustic Soda Buyer's Guide
- ☐ Phosphorus Oxychloride Data Sheet
- ☐ Caustic Soda Data Sheet

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HOOKER CHEMICALS PLASTICS

NEW CHEMICALS for INDUSTRY

RHOPLEX HA-8; 12
(acrylic copolymer in aqueous emulsion)

Sp.G., 1.05; 1.06; Solids content: 46; 45% ± 0.5%; pH, 2.8; Color: milky; Viscosity: low. Chemical properties: liquid; nonionic; excellent mechanical and chemical stability; low-temp. cure; self cross-linking; excellent resistance to water and solvents after curing. Suggested uses: binder for synthetic fiber papers; saturant for paper. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Resinous Products Div.

RHOPLEX B-25
(acrylic copolymer)

pH, 9.0; Solids content: 46%; Color: milky; Viscosity: low dispersion. Chemical properties: nonionic; excellent mechanical stability; toughness in polymer films; contributes edge tear resistance to saturated paper. Suggested uses: saturant for paper. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Resinous Products Div.

RHOZYME 135C
(bacterial diastase)

Purity: 12000 FM units; Solubility: in water. Chemical properties: liquid; high strength; unusual heat stability; low cost. Suggested uses: desizing agent for textile fabrics. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Chemicals & Plastics Div.

RUTEX

Chemical properties: plasticized, modified, acrylic type polymer; high water absorbing and water retaining properties. Suggested uses: plant hygrostat-moisture control agent used to prevent the dehydration of plants in dormant storage; for plant transplanting; replaces conventional packing materials to facilitate bare root shipping. Introduced as: new chemical product. Availability: commercial quantities. UBS Chemical Co., A. E. Staley Mfg. Co.

SANTICIZER 117
(alkyl-aryl phosphate)

M.W., 275, approx.; Sp.G., 1.09. Purity: 100% pure ester; Solubility: in most organic solvents. Chemical properties: levelling agent and plasticizer for polystyrene-acrylic emulsions. Suggested uses: imparts gloss, levelling properties and shelf stability to emulsion floor polishes. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Organic Div.

SANTICIZER 405; 407
(glycol-adipic acid polymeric plasticizer)

M.W., 3000, approx.; Sp.G., 1.129; 1.084; Viscosity: 120; 47 poises at 25 C. Purity: 100% (approx.) polyester; Solubility: in a wide range of organic solvents; miscible with most monomeric and other polymeric plasticizers. Chemical properties: in polyvinyl chloride, optimum resistance to extraction by aqueous and oil-type extractants plus minimum migration to polystyrene and rubber adhesives. Suggested uses: industrial and electrical tape; original refrigerator gasketing; automotive upholstery; baby pants. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Organic Div.

SEAMAG
(magnesium oxide)

MgO; Constituents: MgO + some combined H_2O. M.W., 40.32; Sp.G., approx. 0.38; M.P., >1800 C. Chemical properties: outstanding neoprene-grade; high scorch protection and cure rates. Suggested uses: in neoprene compounding. Introduced as: significantly new grade. Availability: commercial quantities. Food Machinery & Chemical Corp., Mineral Products Div.

SILASTIC RTV 521

Constituents: polydimethylsiloxane, inert fillers, dibutyl tin dilaurate (catalyst). Sp.G., 1.42; Viscosity: 12,000 centipoises. Solubility: when vulcanized, resists most salts, weak acid and base solutions, alcohols, mineral oils; is deteriorated by chlorinated solvents, low boiling aliphatics, and aromatics. Chemical properties: general advantages of most silicone rubber; vulcanizes at room temperature; low viscosity in the unvulcanized state. Suggested uses: encapsulating and potting; flexible molds for plastics and low melting metals; prototype rubber parts. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

SILICON TETRAFLUORIDE

SiF_4. M.W., 104.09; M.P., −90 C at 1233 mm Hg.; B.P., sublimes at −95.1 C. Purity: 99.6%; Solubility: in water (with reaction) and alcohols. Chemical properties: reacts rapidly with water to form Silica Gel. Suggested uses: to decrease porosity of sandstone, concrete, etc. Introduced as: new chemical product. Availability: commercial quantities. The Harshaw Chemical Co., Inorganic Div.

SODIUM 2-CHLOROETHANE-SULFONATE

$C_2H_4ClNaO_3S$; Constituents: 90% active ingredient; 10% sodium chloride. M.W., 166.5. Purity: 90%; Solubility: in water; insoluble in organic solvents. Chemical properties: normal reaction of an organic chloride. Suggested uses: to introduce the sulfoethyl group into organic compounds, including cellulose, starch, alcohols, phenols, thiols, and amines. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., Baker & Adamson Div.

SODIUM HEXYLENE GLYCOL MONOBORATE

$C_6H_{12}O_3BNa$. M.W., 165.98; M.P., 426 C; Bulk density: 0.25 g./cc. Purity: 98%+; Solubility: very soluble in nonpolar solvents. Chemical properties: unique solubility in nonpolar solvents up to 35% by weight. Suggested uses: corrosion inhibitor in organic systems; additive to lubricating oil to reduce sludge; flame retardant additive to nonaqueous paints; additive to siloxane resins to minimize run-off from coated articles. Introduced as: new chemical product. Availability: semicommercial quantities. U. S. Borax Research Corp.

SODIUM PERSULFATE
(sodium peroxydisulfate)

$NA_2S_2O_8$. M.W., 238; Bulk density: approx. 85 lbs./cu. ft.; Color: white; 6.5% active oxygen; 100% through 8 mesh. Purity: 97% min.; Solubility: 549 grams/l. sol. at 20 C. Chemical properties: crystals; extremely stable; activated by e.g. Ag ions. Suggested uses: bleaching and oxidizing agent; promoter for emulsion polymerization reactions. Introduced as: product with new degree of availability. Availability: commercial quantities. Food Machinery & Chemical Corp., Becco Chemical Div.

SOLASOL USP NEEDLES
(sodium lauryl sulfate)

$NaC_{12}H_{25}SO_4$. M.W., 288; Color: light cream. Purity: U.S.P. grade; Solubility: in water and common organic solvents. Chemical properties: dustless needles, easy to handle, reduces irritation, higher bulk density. Suggested uses: in cosmetics, pharmaceutical products. Introduced as: significantly new grade. Availability: commercial quantities. Aceto Chemical Co., New Products Dept.

SPL-ASH
(sodium carbonate or soda ash)

Na_2CO_3. M.W., 106; Sp.G., 2.4; M.P., 851 C. Purity: 99.5%; Solubility: 49.7 g./100 g. water at 35.4 C. Chemical properties: briquetted, pillow-shaped block; dust-free; slowly soluble. Suggested uses: alkalinity control in swimming pools; water treatment. Introduced as: significantly new grade. Availability: commercial quantities. Diamond Alkali Co., Soda Products Div.

STACRYLIC RESIN EMULSIONS

Constituents: copolymer emulsions containing ethyl acrylate as major monomer. Solids content: 46%, 50%; Viscosity: low. Chemical properties: low foam tendencies; excellent shear and multivalent-ion stability; high binding strength; films have good color stability and flexibility, produce smooth coatings of high gloss and excellent printability. Suggested uses: in paper coatings to improve printability and to provide wet-rub and grease resistance. Introduced as: product with new degree of availability. Availability: commercial quantities. A. E. Staley Mfg. Co., Industrial Sales Div.

STANNOUS FLUORIDE

SnF_2. Purity: suitable for topical application. Chemical properties: quick-dissolving powdered form; each unit hermetically sealed and protected against water vapor absorption; topical treatment can produce 30-50% reduction in the incidence of dental caries. Suggested uses: effective anti-caries treatment in single topical application. Introduced as: significantly new grade. Availability: commercial quantities. Metal & Thermit Corp., Chemicals Div.

STARBOND
(cationic potato starch)

Viscosity: high and low. Purity: very low ash; Solubility: in cold water, 0%; in hot water, 100%. Chemical properties: polar adhesion to anionic materials. Suggested uses: sizing for fiberglass. Introduced as: significantly new grade. Availability: semicommercial quantities. Morningstar-Paisley, Textile Div.

STARFILM "T"
(hydroxyethyl ether of tapioca starch)

Solubility: in cold water, 0%; in hot water, 100%. Chemical properties: exceptional stability and clearness of solutions; high degree of reactivity with thermosetting resins. Suggested uses: in textiles; paper; adhesives. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Textile Div.

m-SULFOBENZOIC ACID

$C_7H_6O_5S$. M.W., 238.21; M.P., 140 C; Color: white. Purity: commercial; Solubility: in water, ethanol, ether; insoluble in benzene. Chemical properties: crystals; reactive sulfonic acid and carboxylic acid. Suggested uses: intermediate for detergents, dyes, and pharmaceuticals. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Koppers Co., Inc., Chemicals & Dyestuffs Div.

5-SULFOSALICYLIC ACID (TECHNICAL)

M.W., 218. Purity: 93-95%; Solubility: in water, alcohol, other polar solvents. Chemical properties: trifunctional aromatic compound undergoing reactions typical of phenolic, carboxylic, and sulfonic acid groups. Suggested uses: metal chelation agent; intermediate for surfactants; catalysts; grease additives; etc. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Organic Chemicals Div.

SULFUR TETRAFLUORIDE-BORON TRIFLUORIDE COMPLEX

SF_4BF_3. M.W., 175.9; B.P., sublimes at 80 C. Purity: 99%+. Chemical properties: hygroscopic solid. Suggested uses: fluorinating agent. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., Baker & Adamson Div.

"SUPER CORONA" LANOLIN ANHYDROUS USP

M.P., U.S.P.; Color: 2 A.S.T.M. units max. Purity: highly deodorized. Chemical properties: ultimate in uniformity due to improved manufacturing process. Suggested uses: cosmetic and pharmaceutical preparations where high purity is essential. Introduced as: significantly new grade. Availability: commercial quantities. Croda Inc.

"SUPER HARTOLAN" LANOLIN ALCOHOLS B.P. (lanolin alcohols)

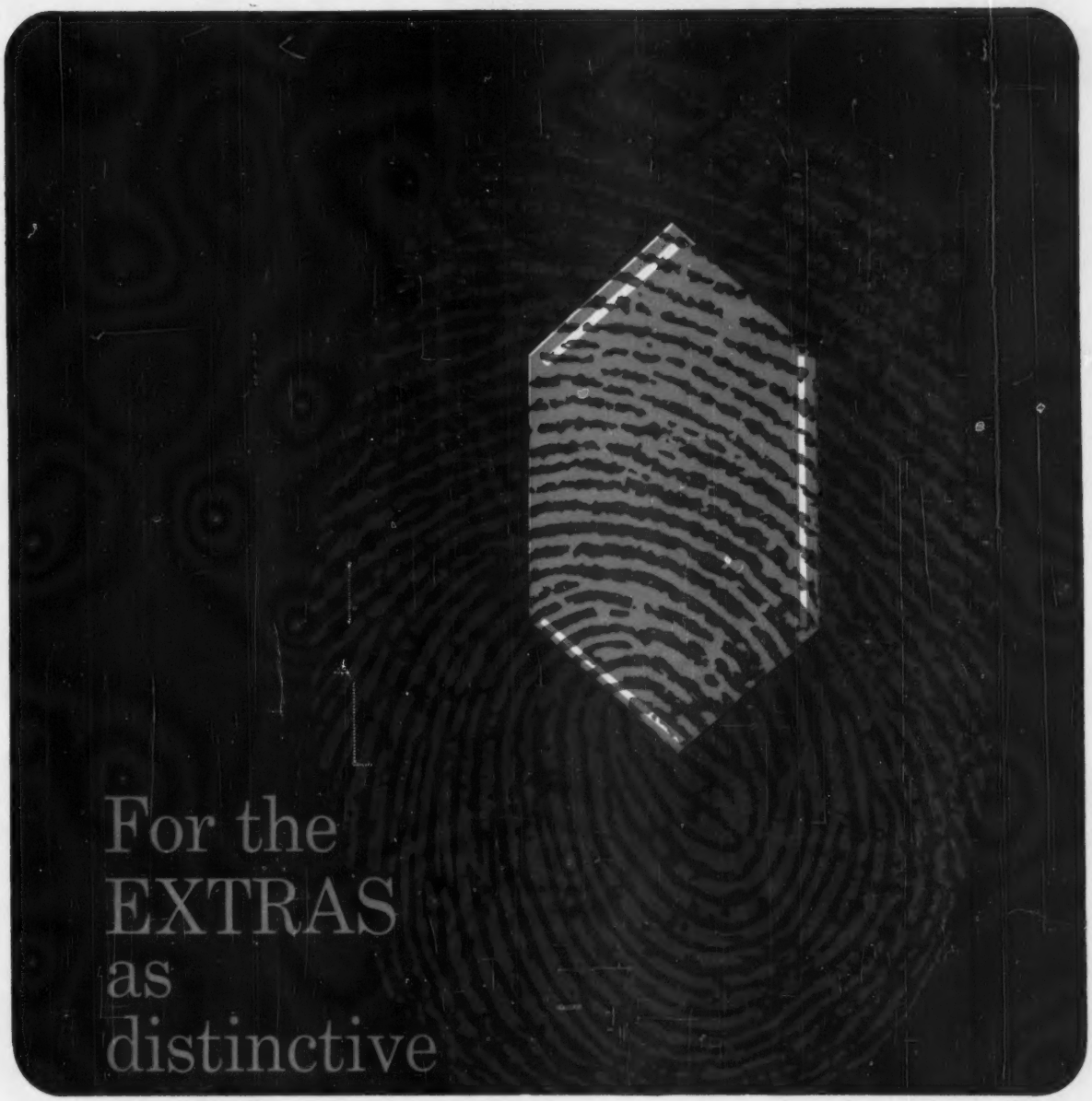
Constituents: mixture of wool wax alcohols obtained by total saponification of wool fat followed by extraction and purification of unsaponifiable part (molecular distillation). M.W., 377 (average); M.P., 70 C; Peroxide value: 2.5%; Cholesterol content: 30-35%. Purity: ultimate purity in mixed lanolin alcohols. Chemical properties: forms hard but plastic, non-oily films. Suggested uses: primary emulsifier for cosmetic and pharmaceutical w/o emulsions; stabilizer for o/w emulsions skin emollient and hair conditioner. Introduced as: significantly new grade. Availability: commercial quantities. Croda Inc.

SUPLEX

Chemical properties: uniform, rapidly soluble granules; mildly alkaline water conditioner, detergent, and foam control agent. Suggested uses: bottle washing. Introduced as: significantly new grade. Availability: commercial quantities. Diamond Alkali Co.; Soda Products Div.

SURFONIC LF-5; -6
(aliphatic alcohol-ethylene oxide adduct terminated by hydrophobic group)

pH, 1% aqueous, 6-8; Cloud Pt.: 1% aqueous, 45-49; 34-37 C; Color, Pt-Co: 100 max; Viscosity: 100 F, 48, 60 centistokes; Per cent



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active: 100. Solubility: completely miscible with water below cloud point; soluble in acetone, benzene, toluene, perchloroethylene, carbon tetrachloride. Chemical properties: nonionic; low foam; good wetting agent. Suggested uses: in mechanical dishwashing; metal cleaning; textiles. Introduced as: new chemical product. Availability: semicommercial quantities. Jefferson Chemical Co., Commercial Development Div.

SURFYNOL 400 SURFACTANTS (ethylene oxide adducts of 2,4,7,9-tetramethyl-5-decyne-4,7-diol)

Constituents: various amounts of ethylene oxide (series of 7). Solubility: in various hydrophilic and hydrophobic liquids, depending on ethylene oxide content. Chemical properties: good acid and alkali stability; good wetters; low foam. Suggested uses: in detergency and cleansing applications; emulsification; pigment dispersion; wetting agents and penetrants for dyeing and finishing of fibers and textiles. Introduced as: new chemical product. Availability: laboratory quantities. Air Reduction Chemical Co.

SYL-AD 1; 6; 11

Constituents: dilution of a particular silicone in toluene. Solubility: in aromatic solvents, mineral spirits, ketones. Chemical properties: prevents floating, flooding and silking in paints when added in very low concentrations (0.1%); improves surface "slip" and mar resistance of paints; dried paint film is recoatable. Suggested uses: paint additive. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

TMT-5 (3,3,3′,3′-tetramethyl-1,1′-spirobi (indan)-5,5′,6,6″-tetrol)

$C_{21}H_{24}O_4$. M.W., 340.2; M.P., 314-16 C; Color: yellow. Purity: technical; Solubility: in acetone; insoluble in water. Chemical properties: crystalline powder; reactive hydroxyl groups. Suggested uses: antioxidant for petroleum products, plastics, resins, rubber, paints, varnishes; accelerator for chloroprene rubbers. Introduced as: product with new degree of availability. Availability: commercial quantities. Koppers Co., Inc., Chemicals & Dyestuffs Div.

TPTZ (2,4,6-tripyridyl-s-triazine)

$(C_5H_4N)_3C_3N_3$. Color: lt. tan. Purity: reagent grade. Chemical properties: powder. Suggested uses: exceptionally sensitive reagent for the colorimetric determination of iron. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

TAM ACETATO-ZIRCONYL CHLORIDE

$Zr(OH)_2\ (CH_3COO)_{1.4}\ Cl_{0.6} - H_2O$; Constituents: varies, depending upon conditions of preparation. M.W., 247.02. Solubility: 900 g./l. H_2O, slightly soluble in methanol; insoluble in acetone and acetic acid. Chemical properties: certain anions (acid dye) replace the chloride ion forming insoluble toners. Suggested uses: precipitant for acid dyes; in zirconium chemicals such as oxide by calcination; in pharmaceuticals (poison ivy lotion) and cosmetics (personal deodorants). Introduced as: new chemical product. Availability: laboratory quantities. National Lead Co., TAM Div.

TAM CARBONATED HYDROUS ZIRCONIA, 32%

$2ZrO_2 \cdot CO_2 \cdot xH_2O$. M.W., variable; M.P., decomposes to ZrO_2; Color: white. Solubility: in mineral acids, acetic acid and alkali carbonate solution; insoluble in water and non-acid organic solvents. Chemical properties: moist pulp; removes many substances from solution by adsorption or sequestration. Suggested uses: in zirconium chemicals; in pharmaceuticals and cosmetics. Introduced as: significantly new grade. Availability: semicommercial quantities. National Lead Co., TAM Div.

TAM SPECIAL HYDROUS ZIRCONIA 32% (hydrous zirconium dioxide)

$Zr_2O \cdot xH_2O$. M.W., variable; ZrO_2 content: 32% min. Purity: 99% $ZrO_2 \cdot xH_2O$; Solubility: insoluble in water, non-acid organic solvents, weak acids, dilute alkalies; slightly soluble in conc. caustic alkalis. Chemical properties: strongly adsorbs oxygen-containing anions and oxygen-containing organic substances from aqueous solutions. Suggested uses: pharmaceuticals for treating poison ivy and similar dermatoses; body deodorants; removal of impurities from organic compounds by selective adsorption. Introduced as: significantly new grade; product with new degree of availability. Availability: semicommercial quantities. National Lead Co., TAM Div.

TAM ZIRCONIUM ACETATE SOLUTION

$H_2ZrO_2(C_2H_3O_2)_2$; Constituents: 22% ZrO_2 min. M.W., 243.3; Sp.G., approx. 1.46; pH, 3.8-4.2 at 20 C; Fr. Pt.: soft solid; redissolves when warmed −0.7 C. Solubility: in acid solutions. Chemical properties: converts to hydrous zirconia with alkali. Suggested uses: in marine fuel additive; in water repellents for textiles; catalyst for silicone resins for leather and textiles; precipitation and fixation of protein type molecules. Introduced as: significantly new grade. Availability: commercial quantities. National Lead Co., TAM Div.

TAM ZIRCONYL HYDROXYNITRATE SOLUTION (basic zirconyl nitrate solution)

$ZrOONHO_3$; Constituents: 20% min. ZrO_2. Sp.G., 1.35 (approx.) at 25 C; pH, approx. 0.7 at 25 C. Chemical properties: forms hydrous zirconia with bases; reacts with HNO_3 to form normal zirconyl nitrate. Suggested uses: gelations of polyvinyl alcohol; precipitation of acid dyes; improving lamination bonds of polyvinyl alcohol coated surfaces. Introduced as: new chemical product. Availability: semicommercial quantities. National Lead Co., TAM Div.

TAM ZIRCONYL NITRATE SOLUTION

$ZrO(NO_3)_2$; Constituents: 20% min. ZrO_2. M.W., 231.3; Sp.G., approx. 1.43 at 25 C; pH, approx. 0.3 at 25 C. Chemical properties: precipitates α-hydroxy organic acids; forms hydrous zirconia with ammonium hydroxide. Suggested uses: in high purity zirconium chemicals; gelation of polyvinyl alcohol; improving lamination bonds of polyvinyl alcohol coated surfaces. Introduced as: new chemical product. Availability: semicommercial quantities. National Lead Co., TAM Div.

TAMOL SN

Solubility: in water. Chemical properties: free-flowing powder; chemically stable over wide pH range. Suggested uses: dispersing agent for pigments and colors; pitch control in paper-making; leather tanning. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas, Resinous Products Div.

TANTALUM PENTACHLORIDE

$TaCl_5$. M.W., 358.4; Sp.G., 3.68 (real); M.P., 215.9 C; B.P., 232.9 C; Color: white. Purity: 99.5%. Chemical properties: fine powder. Suggested uses: in production of metal; coating of metal particles; chemical intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Stauffer Chemical Co., Market Development Dept.

TEMEX 3A; 4 (barium-zinc organic)

Sp.G., 1.37; 1.17; Color: white. Purity: high. Chemical properties: fine powder; superior heat and light stability; retention of initial compound color shades; excellent resistance to sulfide staining, plate-out and moisture pick-up; non-lubricating; excellent dispersion characteristics. Suggested uses: stabilizer for all types of vinyl homogeneous floor tile and medium loaded asbestos-filled vinyl tile. Introduced as: new chemical product. Availability: commercial quantities. National Lead Co.

TEMEX 5 (metal salt—Organic complex)

Sp.G., 1.5; Color: white. Purity: high. Chemical properties: fine powder; good heat and light stability; resistance to sulfide staining; non-lubricating; good resistance to warping. Suggested uses: stabilizer for utility-grade asbestos filled vinyl flooring. Introduced as: new chemical product. Availability: commercial quantities. National Lead Co.

TERGITOL 12-P-6 (dodecyl phenol adduct with 6 mols of ethylene oxide)

M.W., 526. Purity: 100%. Suggested uses: general purpose nonionic surfactant; sulfation. Introduced as: a new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

TERGITOL 12-P-9 (dodecyl phenol adduct with 9 mols of ethylene oxide)

M.W., 658; Sp.G., 1.0455; Viscosity: 136 cks. at 100 F; Purity: 100%; Color: less than 100 Pt-Co; pH, 5-8. Solubility: in toluene; slightly soluble in aliphatic hydrocarbons, mineral oil and water. Suggested uses: nonionic surfactant for use in chemical, paint, detergent, cosmetic, rubber, dry cleaning, and textile industries. Introduced as: a new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

TERGITOL 12-P-12; 15 (dodecyl phenol adduct with 12,15 mols of ethylene oxide)

M.W., 790; 920; Sp.G., 1.0555; 1.0520; Fr.Pt.: 15; 29.5 C.; Viscosity: 148; 163 cks. at 100 F; Purity: 100%; Color: <100 Pt-Co. Solubility: in toluene and in water; Cloud Pt.: 60 C. Suggested uses: general purpose nonionic surfacant. Introduced as: a new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

TERGITOL TMN-3 (trimethyl nonanol adduct with 3 mols of ethylene oxide)

M.W., approx. 318; Sp.G., 0.9355; Fr.Pt.: sets to glass at −40 C; Viscosity: 15 cks. at 100 F; pH, 5-8; Color: < 100 Pt-Co. Purity: 100%; Solubility: in toluene; slightly soluble in aliphatic hydrocarbons and mineral oil; insoluble in water. Suggested uses: aromatic-soluble nonionic surfactant. Introduced as: a new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

TERGITOL TMN-10 (trimethyl nonanol adduct with 10 mols of ethylene oxide)

M.W., 626; Sp.G., 1.0416; Fr.Pt.: −7.5 C; Viscosity: 58 cks. at 100 F; pH, 5-8; Color: < 100 Pt-Co; Cloud Pt.: 72 C. Purity: 100%; Solubility: completely in water. Suggested uses: general purpose nonionic surfactant. Introduced as: a new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

TETRABROMO BISPHENOL A

$(CH_3)_2C(C_6H_2Br_2OH)_2$. M.W., 543.91; M.P., 172-179 C. Purity: 95% min.; Solubility: in acetone, ethyl, ether, methanol; slightly soluble in benzene; insoluble in heptane. Suggested uses: fire retardant; component for S.E.-Epoxies. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Dow Chem. Co.

2,2,4,5-TETRACHLOROCYCLOPENTENE-1,3-DIONE

$C_5O_2Cl_4$. M.W., 233.89; M.P., 65-66.5 C; B.P., 230 C. Purity: 99+% recryst.; Solubility: in acetone; insoluble in water. Chemical properties: reacts with ammonia, amines, alcohols, organic phosphates. Suggested uses: chemical intermediate for drugs, dyes, agricultural chemicals. Introduced as: new chemical product. Availability: laboratory quantities. Hooker Chemical Corp., Product Development Div.

TETRACHLOROSULFENYL CHLORIDE (1,2,2,2-tetrachlorosulfenyl chloride)

$C_2H_1Cl_4S$. M.W., 234.5; B.P., 57 C at 1 mm. Purity: 95+%; Solubility: in benzene, CCl_4, heptane. Chemical properties: reacts with olefins, phosphites, mercaptans. Suggested uses: chemical intermediate agricultural chemicals, resins, dyes, etc. Introduced as: new chemical product. Availability: laboratory quantities. Hooker Chemical Corp., Product Development Div.

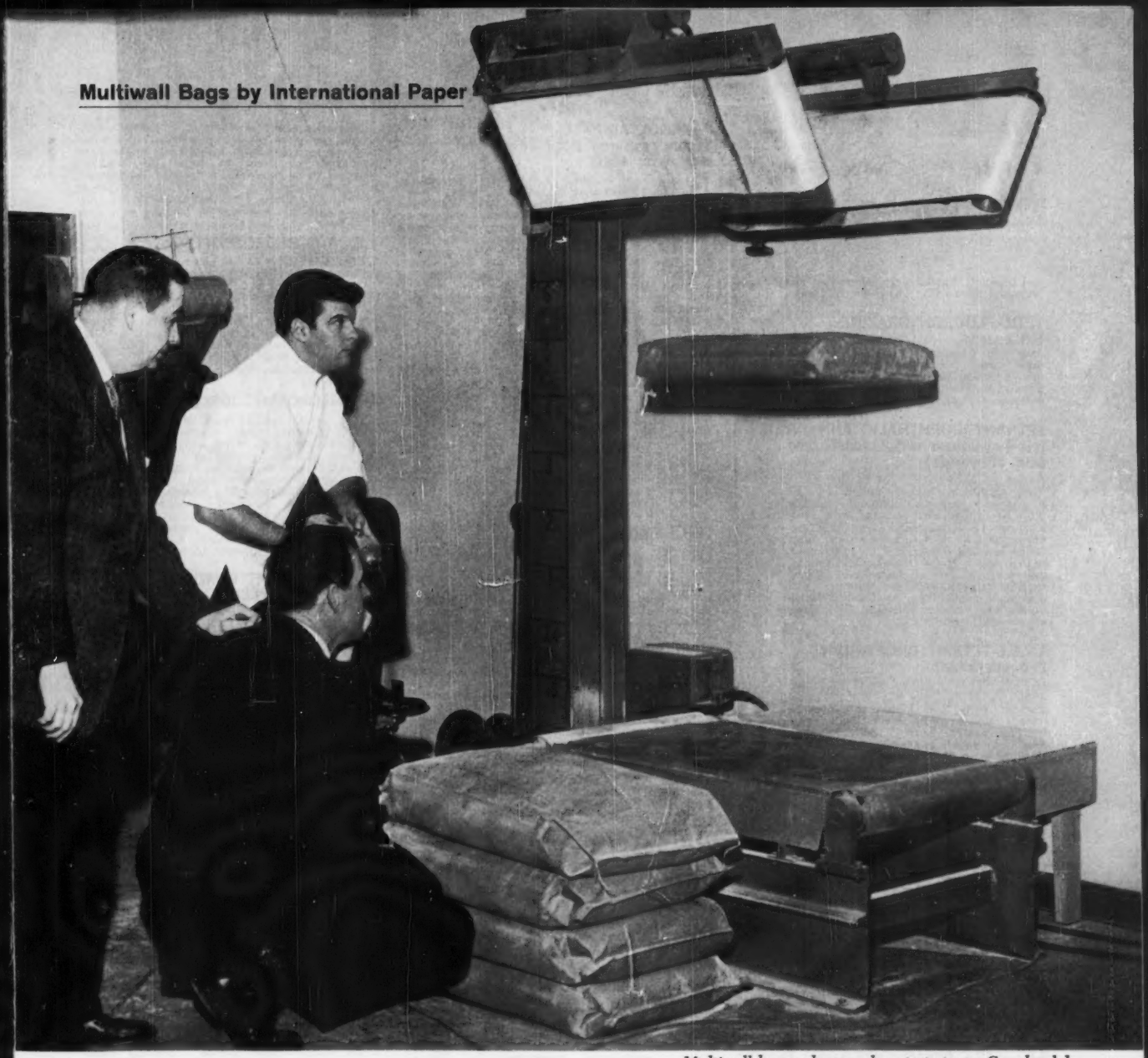
TETRACHLOROTHIOPHENE

C_4Cl_4S. M.W., 221.93; M.P., 29-30 C; B.P., 104 C at 10 mm. Solubility: benzene, hexane, alcohols, chlorocarbon. Suggested uses: in agricultural and lubricant fields. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Hooker Chemical Corp., Product Development Div.

1,7,13-TETRADECATRIYNE

$C_{14}H_{14}$. M.W., 186.3; Sp.G., 0.865 at 25 C; 0.807 at 105 C; M.P., −3 C; B.P., 111-2 C at 1.0 mm Hg. Purity: 99%+; Solubility: in organic solvents; insoluble in water. Chemical properties: linear nonconjugated polyacetylene of excellent heat stability. Suggested uses: energetic rocket fuel plasticizer, extender, binder; organic chemicals intermediate; oil well corrosion inhibitor. Introduced as: new chem-

Multiwall Bags by International Paper



Multiwall bag undergoes drop test at new Camden lab.

Trial by torture

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MULTIWALL BAGS must withstand punishment. It is their job. But, as industry expands its use of multiwalls, each new product presents totally new problems for these versatile bags.

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Here, new bag papers, adhesives and closing materials are subjected to virtually every gruelling condition they might meet en route from plant to consumer. The bag in our photograph is undergoing a drop test, one of many tortures new bags encounter.

Our laboratory also includes an "Arctic-Jungle Room" where temperature and humidity may be varied *drastically*. A vibration table to simulate the effects of truck and rail motion. And the latest equipment to determine exactly the right bag for any product—new or old.

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ical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

TETRAFLUOROHYDRAZINE

N_2F_4. M.W., 104.0; B.P., −73 C; Purity: 85% min. Chemical properties: colorless gas in pure form; strong oxidizer. Introduced as: new chemical product. Availability: laboratory quantities. Stauffer Chemical Co., Market Development Dept.

TETRAHYDROPHTHALIC ANHYDRIDE (cis-4-cyclohexene-1,2-dicarboxylic acid anhydride)

$C_8H_8O_3$. M.W., 152.1 M.P., 100 C. Purity: 99% tetrahydrophthalic anhydride. Chemical properties: lower melting point than analagous phthalic anhydride; reacts with polyhydric alcohols to form alkyd type polyesters and monohydric alcohols to form esters; cures epoxy resins forming diester and ether linkages. Suggested uses: epoxy crosslinking agent; diacid ingredient to form light colored alkyds; plasticizers. Introduced as: product with new degree of availability. Availability: commercial quantities. Stauffer Chemical Co., Market Development Dept.

1,2,5,6-TETRAHYDROPYRIDINE (δ-3-piperidine)

C_5H_9N. M.W., 83.08; Sp.G., 0.912-0.914 at 20/4 C; M.P., −44 C; B.P., 115.5-120 C. Purity: 96% min. Chemical properties: secondary amino group reacts as in piperidine, forming acetyl, benzoyl derivatives; can be alkylated; double bond will add on one molecule of bromine; nucleous found in natural alkaloids: arecoline and guvacine. Suggested uses: intermediate. Introduced as: new chemical product. Availa'ility: semicommercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

TETRAMETHYLAMMONIUM CHLORODIBROMIDE

$(CH_3)_4NClBr_2$. M.W., 269.3; M.P., 118-126 C. Solubility: in water and other polar solvents. Chemical properties: liberates elemental bromine on contact with water. Suggested uses: dry brominating agent; active ingredient in formulation of sanitizers. Introduced as: new chemical product. Availability: semicommercial quantities. Michigan Chemical Corp.

TETRAMETHYLETHYLENEDIAMINE (TMEDA-70%) (n,n,n',n'-tetramethylethylenediamine)

$C_6H_{16}N_2$; Constituents: 70% TMEDA. M.W., 116; Sp.G., 0.850 at 25 C; M.P., −23 C; B.P., 95-96 C (azeotrope with water); Purity: 70% aqueous solution; Solubility: in water. Suggested uses: catalyst for polyurethane formation; epoxy resins; chemical intermediate; particularly for quaternary ammonium compounds. Introduced as: new chemical product. Availability: commercial quantities. Rohm & Haas, Special Products Dept.

TETRAMETHYLLEAD

$(CH_3)_4$ Pb. M.W., 267.35; B.P., 230 F; Solubility: in water and gasoline in all proportions. Suggested uses: gasoline antiknock compound. Introduced as: new chemical product. Availability: commercial quantities. Ethyl Corp.

TEXANOL (2,2,4-trimethylpentanediol monoisobutyrate)

$C_{12}H_{24}O_3$ M.W., 216.3; Sp.G., 0.9472 at 20/20C; B.P., 180-182C at 125 mm.; Flash Pt.: 245 F COC. Solubility: miscible with benzene, ethanol (95%), acetone, and carbon tetrachloride; insoluble in water. Chemical properties: branched chain structure; neopentyl configuration contributes to thermal stability of derivatives; good temp.-viscosity characteristics; mild odor. Suggested uses: chemical intermediate: terminating alcohol in polyester preparation; preparation of plasticizers; base material in preparation of synthetic lubricants. Introduced as: new chemical product. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

TEXANOL ADIPATE (ester prepared from adipic and isobutyric acid)

Sp.G., 1.00 at 20/20C. M.P., −36.4F.; Color: 3 Gardner; Flash Pt.: 395F COC; Purity 99%; Chemical properties: mild odor; in plastics, imparts good mechanical properties and permanence, good resistance to soapy water extraction; in plastisols, good viscosity stability and low yield values. Suggested uses: permanent-type plasticizers for vinyl films and plastisols; cellulose nitrate and cellulose acetate butyrate lacquers. Introduced as: new chemical product. Availability: semicommercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

THIOACETIC ACID (ethanethiolic acid)

CH_3COSH. M.W., 76.11; Sp.G., 1.064; M.P., −75C; B.P., 88-91C; Solubility: in common organic solvents. Chemical properties: reacts with olefinic and acetylenic bonds, epoxides, nitriles, and azo benzenes. Suggested uses: polymer, resin, and rubber modification; intermediate for primary mercaptans, agricultural pesticides and pharmaceuticals. Introduced as: new chemical product. Availability: laboratory quantities. Stauffer Chemical Co., Market Development Dept.

THIOBENZOIC ACID

C_7H_6OS. M.W., 138.11; Sp.G., 1.1825-1.1835 at 20/4C; M.P., 19-21C; B.P., 77.5C at 5mm; 122C at 30mm; R.I.: N20/D, 1.602-1.604. Purity: 95% min.; Solubility: insoluble in water; miscible in all proportions with organic solvents. Chemicals properties: oxidizes to dibenzoyl disulfide; a strong acid and forms salts with metals; forms esters; will saturate double bonds; prevents crystallization of natural rubber at low temperatures; peptizes natural rubber. Suggested uses: organic intermediate; in zinc thiobenzonate. Introduced as: new chemical product. Availability: commercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

THIO-BISPHENOL (bis-p-hydroxy phenyl sulfide)

$S(C_6H_4OH)_2$. M.W., 218; M.P., 140-144C; Color: white. Solubility: in acetone and methanol. Chemical properties: solid; stable at normal temps., exhibits most of the reactions of phenol. Suggested uses: rubber additives; surface coatings; biocides. Introduced as: new chemical product. Availability: laboratory quantities. Stauffer Chemical Co., Market Development Dept.

THIODIPROPIONATE ANTIOXIDANT (dilauryl thiodipropionate antioxidant)

Constituents: 70% lauryl ester; 20% myristyl ester; 10% cetyl ester of thiodipropionic acid. M.W., Approx. 542; Sp.G., 0.975 at 25C.; M.P., 30-33C; B.P., 170C at 1.8 mm.; Solubility: very in benzene, methylene chloride, ether and naphtha. Chemical properties: non-discoloring antioxidant with clearance by FDA. Suggested uses: antioxidant for olefin polymers; edible fats and oils; waxes and lubricants. Introduced as: new chemical product. Availability: commercial quantities. Du Pont, Industrial & Biochemicals Dept.

2-THIOHYDANTOIN (glycolyl thiourea)

$C_3H_4ON_2S$. M.W., 116.14; M.P., 230C.; Ash: 0.25% max.; Moisture: 0.25% max. Purity: 99% min.; Solubility: slightly in water; insoluble in alcohols and ethers. Chemical properties: Imino and methylene hydrogens and the carbonyl group are active. Suggested uses: intermediate for medicinal chemicals, rubber accelerators, copper plating brighteners and dyestuffs. Introduced as: new chemical product. Availability: commercial quantities. Benzol Products Co., Research & Development.

TITANIUM DIOXIDE P-25 (titanium dioxide)

TiO_2. Particle size: 330 A; Anatase 95%; Rutile 5%; Surface Area (B.E.T.): 45 m^2/g. Purity: 98% +; Suggested uses: delustering agent for textiles; free-flowing agent; U.V. screening agent; control-chalking agent for exterior paints. Introduced as: significantly new grade. Availability: semicommercial quantities. Cabot Corp. Minerals & Chemicals Div.

TOLUIDINE RED EXTRA LIGHT 10486

Sp.G., 1.40; Color: distinctive yellow. Purity: commercial; Chemical properties: produces a high-gloss, haze-resistant finish. Suggested uses: where the gloss of the conventional Toluidine Red pigment has been insufficient or the haze produced too great to permit a Toluidine pigment to be employed in the past. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

1,2,3-TRICHLOROPROPENE

CH Cl C Cl CH_2 Cl; Constituents: equal parts mixture of the cis and trans isomers. M.W., 145.45; Sp.G., 1.412 $^{25}/_{4}$C; B.P., 138-151C; Purity: 95%; Solubility: in acetone, benzene, carbon tetrachloride, ethyl ether, methanol; insoluble in water. Chemical properties: double bond and allylic chloride very reactive. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: commercial quantities. Dow Chemical Co.

TRICHLOROTRIFLUOROACETONE

CCl_2F . CO . $CClF_2$. M.W., 215.40; B.P., 84.5C; Color: water white. Solubility: in all proportions with water and in most organic solvents. Chemical properties: stable to acids but reacts with alkalies to form derivatives of monochlorodifluoroacetic acid;; readily complexes with compounds containing active hydrogen atoms. Suggested uses: solvent in acidic media; complexing agent. Introduced as: new chemical product. Availability: semicommercial quantities. Allied Chemical Corp., General Chemical Product Development Div.

TRICLENE PAINT GRADE TRICHLORETHYLENE

Constituents: 99.9% pure trichlorethylene with added stabilizers. Sp.G., 1.460—1.466 at 15/4C; B.P., 85.4—87.9C; Chemical properties: specially stabilized to withstand processing stresses such as heat, oxygen, moisture, and light. Suggested uses: thinner for paints used in nonflammable, trichlorethylene-based painting processes. Introduced as: significantly new grade. Availability: commercial quantities. Du Pont, Electrochemicals Dept.

TRIFLUOROACETIC ACID

CF_3 . COOH. M.W., 114.03; Fr. Pt.: −15.4C; B.P., 71.8; Color: water white. Solubility: in water; completely miscible with ether, acetone, ethanol, benzene, carbon tetrachloride, n-hexane, and perfluoro-n-hexane. Chemical properties: pungent liquid; very strong non-oxidizing acid, comparable in strength to trifluoroacetic acid. Suggested uses: medium for inorganic ionic type reactions; solvent including use for proton spin resonance studies; catalyst for organic reactions, particularly esterifications and condensations. Introduced as: new chemical product. Availability: semicommercial quantities. Allied Chemical Corp. General Chemical Product Development.

TRIFLUOROETHYL CHLORIDE (1,1,1,-trifluoro-2-chloro ethane)

CF_3CH_2Cl. M.W., 118.5; Sp.G., 1.389; M.P., —105.5C; B.P., 6.1C; Purity: 99.5% min.; Solubility: miscible with most polar and non-polar organic solvents; 10-20% in propylene glycol, polyethylene glycol. Chemical properties: good solvent-propellant; outstanding stability. Suggested uses: aerosol propellant; pharmaceuticals; cosmetic and personal products; Introduced as: new chemical product. Availability: laboratory quantities. Pennsalt Chemicals Corp., Research Products Development Dept.

TRIMETHYL PHOSPHITE

$C_3H_9O_3P$. M.W., 124.08; B.P., 108C; Purity: min 98%; Solubility: in acetone alcohols, aromatics; chlorinated ethers solvents. Suggested uses: intermediate for fluids, additives, dyes. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Hooker Chemical Corp., Product Development Div.

TRIOL A-300 (4-{2-[bis-(2-hydroxypropyl)amino] ethyl} α-methyl-1-piperazinethanol

$C_{15}H_{33}O_3N_3$. M.W., 303; Color: Pt-Co 100, lt. yellow PH, (1% aq.) 10.8; Total amine; 6.45 meq./g. Purity:> 98%; Chemical properties: viscous liquid; exhibits reactions of a triol and a tri-tert-amine; forms water-soluble salts of organic acids. Suggested uses: curing and cross-linking agent for urethane foams and elastromers; intermediate to corrosion inhibitors. Introduced as: new chemical product. Availability: laboratory quantities. Jefferson Chemical Company, Inc. Commercial Development Div.

TRISEC

Constituents: solution of surfactant in trichloroethylene. B.P., 87C; Suggested uses: rapid stain-free drying of water-wet metal after electro-plating, phosphating, chromating, electropolishing, contour etching, acid pickling, bright dipping, etc.; drying of glass, printed circuit boards and other articles not affected by trichloroethylene. Introduced as: new chemical product. Availability: commercial quantities. Chemical Manufacturing Company Inc.

TUNGSTEN HEXAFLUORIDE

WF_6. M.W., 298; M.P., 2.5C; B.P., 17.1C. Chemical properties: colorless gas. Suggested uses: vapor phase deposition of tungsten; fluorinating agent. Introduced as: new chemical product. Availability: semicommercial quantities. Allied Chemical Corp. General Chemical Product Development Div.

UNITOL CMT
(tall oil fatty acids)

Constituents: 98.9% fatty acids, 0.5% rosin acids, 0.6 unsaponifiable. Sp.G., 0.9048 at 60/-60F; Color: Gardner 1-2; Chemical properties: lightest-colored tall oil fatty acid commercially available; impurities causing red color formation on epoxidation reduced to negligible factor. Suggested uses: plasticizers; surfactants; resins. Introduced as: significantly new grade. Availability: commercial quantities. Union Bag-Camp Paper Corp. Chemical Products Div.

URACIL
(2,4-(1,3)-pyrimidinedione)

$C_4H_4N_2O_2$. M.W., 112.09; M.P., 335 C with effervescence; Color: white. Purity: 99.5% min.; Solubility: freely in hot water; in ammonium hydroxide and other alkalies. Chemical properties: crystalline powder; sulfur-free. Suggested uses: pharmaceutical intermediate. Introduced as: product with new degree of availability. Availability: commercial quantities. American Cyanamid Co., Fine Chemicals Dept.

UREA, REAGENT GRADE
(carbamide)

H_2NCONH_2; Constituents: Ignition residue: 0.020% maximum; Chlorides: 0.002%; Sulfate: 0.005% maximum; Heavy Metals: 0.0005% maximum; Iron: 0.0005% maximum; Dirt: 10 ppm maximum; Magnetic Particles: none; Lint: 10 ppm. M.W., 60.06; M.P., 132-133 C. Solubility: in water, 5g./100 mg.; insoluble in alcohol. Chemical properties: biuret content: 0.006%. Suggested uses: in pharmaceuticals requiring minimum biuret content and other foreign matter. Introduced as: significantly new grade; product with new degree of availability. Availability: commercial quantities. American Cyanamid, Fine Chemicals Div.

UVINUL N-35
(substituted acrylonitrile)

M.P., 95-100 C; K value (absorbancy index) at 303 mm. in methanol: 46 min.; Per cent active: 100; Color: white. Solubility: in alcohols, esters, ketones, methyl- and vinyl-pyrrolidone, toluene; insoluble in water. Chemical properties: powder; ultraviolet-radiation absorber that does not contain acidic hydroxyl radicals. Suggested uses: in nitrocellulose lacquers; butadiene-styrene latices; urea- and melamine-formaldehyde; epoxamines; nylon; polyvinyl chloride; polyesters; alkyds, etc. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

VERY OZONE-RESISTANT BUTYL RUBBER

Unsaturation (in Iodine No.): 14 cg./g.; Viscosity (Mooney): 55 at 260 F. Chemical properties: more resistant to ozone degradation than conventional grades of butyl rubber. Suggested uses: automotive weather strip; wire insulation; gasketing for construction; mechanical molded goods. Introduced as: new chemical product. Availability: laboratory quantities. Enjay Chemical Co., Market Development.

VINAC AA-63
(polyvinyl acetate homopolymer emulsion)

M.W., high; Sp.G., 1.104; Solids content: 55% min.; Viscosity: 1700-2200 cps. Solubility: infinitely with water. Chemical properties: may be thickened with fully hydrolyzed polyvinyl alcohols without "creaming". Suggested uses: adhesive base for paper products, cement bonding. Introduced as: significantly new grade. Availability: commercial quantities. Air Reduction Chemical & Carbide Corp., Colton Products.

VINYL DURENE
(2,3,5,6-tetramethylstyrene)

$C_{12}H_{16}$. M.W., 160; M.P., 20-30 C; B.P., 89 C at 2.5 mm. Purity: 97-99%; Solubility: in most organic solvents; insoluble in water. Chemical properties: waxy solid; vinyl derivative which undergoes polymerization. Suggested uses: monomer and co-monomer; plastic research. Introduced as: new chemical product. Availability: laboratory quantities. Gallard-Schlesinger Chemical Mfg. Corp.

2-VINYLNAPHTHALENE

C_6H_5. M.W., 154; M.P., 65-66 C; B.P., 76-81 C at 2.5 mm. Purity: 97%; Solubility: moderately in organic solvents. Suggested uses: research and plastics field; organic intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Gallard-Schlesinger Chemical Mfg. Corp.

VINYMUL 71-3651
(polyvinyl acetate)

Sp.G., approx. 1.12. Chemical properties: heterogeneous particle size for this type resin emulsion; excellent rheological properties. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Chemical Div.

VINYMUL X484
(polyvinyl acetate copolymer)

Solids content: 55%. Chemical properties: thermosetting-crosslinks when cured producing stiff, durable finish. Suggested uses: textile finish. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Textile Div.

VIRCOL-189

Sp.G., 20/4-1.130; B.P., high; Colorless. Purity: technical grade; Solubility: in ethylene glycol, glycerine, methanol ethyl acetate, toluene, benzene, mineral oil, methyl ethyl ketone, dioxane, tetrahydrofuran, ethylene chloride, carbon tetrachloride and chloroform; partially soluble in water; insoluble in diethyl ether, diisopropyl ether, petroleum ether and pentane. Chemical properties: pleasant odor, neutral, fluid organic phosphorus. Suggested uses: plasticizer for polyvinyl alcohol; in films, coatings and moldings; where low volatility, decreased water sensitivity and increased tensile strength is need. Introduced as: new chemical product; product with new degree of availability. Availability: semicommercial quantities. Virginia-Carolina Chemical Corp., Chemicals.

VIRCO-PET 30

Sp.G., 1.062 at 20/4 C; Viscosity: 332 centistokes. Purity: technical grade; Solubility: in water, acetone, ethanol, ethyl acetate, carbon tetrachloride, benzene, toluene, ethylene glycol, methylene chloride, chloroform, dioxane and tetrahydrofuran; insoluble in diethyl ether, diisopropyl ether, gasoline, kerosene, petroleum ether and naphtha. Suggested uses: corrosion inhibitor for aluminum and its alloys; protector for steel, copper and brass. Introduced as: new chemical product. Availability: semicommercial quantities. Virginia-Carolina Chemical Corp., Chemicals Div.

VITEX

Constituents: amylose plus solubilizing material. Chemical properties: solid form. Suggested uses: substitute indicator for starch in iodometric titrations. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

VORLEX

Constituents: methyl isothiocyanate and chlorinated C_3 hydrocarbons including 1,3-dichloropropene and related chlorinated hydrocarbons. Sp.G., 1.15; Per cent active: 100. Purity: 100%; Solubility: generally solvent in most organic solvents. Chemical properties: liquid. Suggested uses: in control of weeds, diseases, nematodes, and insects. Introduced as: new chemical product. Availability: commercial quantities. Morton Chemical Co., Agricultural Div.

WITCO FOMREZ C-2
(stabilized stannous octoate)

Sp.G., 1.25. Chemical properties: greatly reduced loss of "stannous" content on exposure to air. Suggested uses: catalyst for urethane foams. Introduced as: significantly new grade. Availability: commercial quantities. Witco Chemical Co., Inc., Organic Chemicals Div.

WITCOLITE

Constituents: resinous hydrocarbon manufactured from petroleum, free from aggregate fillers. Thermal insulation value (K) 0.40-0.60 BTU/hr., per sq. ft., per F, per inch of thickness; Water absorption: total immersion 6 weeks at 77 F, Grade A 0.732% gain, Grade B 0.701. Chemical properties: granular adhesive; cures to form three zones of insulation around pipe; excellent resistance to water, acid and alkalies; provides high thermal insulation. Suggested uses: hot and cold insulation for underground pipes. Introduced as: significantly new grade; product with new degree of availability. Availability: commercial quantities. Witco Chemical Co., Inc., Pioneer Products Div.

X-COR
(modified fatty amine)

Solubility: in oil. Chemical properties: free-flowing liquid; film-forming. Suggested uses: additive for water-base and oil-in-water emulsion drilling fluids for protecting metals from corrosion caused by hydrogen sulfide, electrolytes and oxidation. Introduced as: new chemical product. Availability: commercial quantities. Baroid Div., National Lead Co.

p-XYLENE-α,α-DIOL

$C_8H_{10}O_2$. M.W., 138.16; M.P., 118 C; B.P., 138-143 C at 0.8-1.0 mm Hg; Color: white. Purity: approx. 98%; Solubility: at 25 C: water 3.3%; MeOH 27.8%; benzene 0%; CCl_4 0%; n-heptane 0%; ethyl ether 1.7%. Chemical properties: crystalline solid; two active hydroxyl groups. Suggested uses: in esters, polyethers, polycarbonates, polyesters; crosslinker for polyurethanes. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Diamond Alkali Co., Development Dept.

2,6 XYLIDINE
(2,6-dimethylaniline)

$C_8H_{11}N$. M.W., 121; M.P., 176 C min.; Color: pale straw; Diazotisable: 99.5% min.; Nitro content: 0.05% max.; Water content: 0.2% max. Purity: 98.0% min. Chemical properties: liquid. Suggested uses: organic intermediate. Introduced as: significantly new grade. Availability: commercial quantities. Aceto Chemical Co., Inc., New Products Div.

XYLITOL
(pentanepentol)

$CH_2OH(CHOH)_3CH_2OH$. M.W., 152.15; Sp.G., (55% aq. sol.) 1.2; M.P., 95 C; Color: white. Purity: 99%; Solubility: (at 20 C) 68 gs. in 100 ml. water. Chemical properties: crystalline; odorless; similar to pentaerythritol and sorbitol; can be estrified with organic acids. Suggested uses: softener, humidifier, sweetener, organic synthesis; applications similar to other polyols in pharmaceuticals, cosmetics, plastics, synthetic resins, paper, food-stuffs, tobacco, etc. Introduced as: new chemical product. Availability: semicommercial quantities. Eastern Chemical Corp., Market Development Div.

XYLOSE
(d-(+)-xylose)

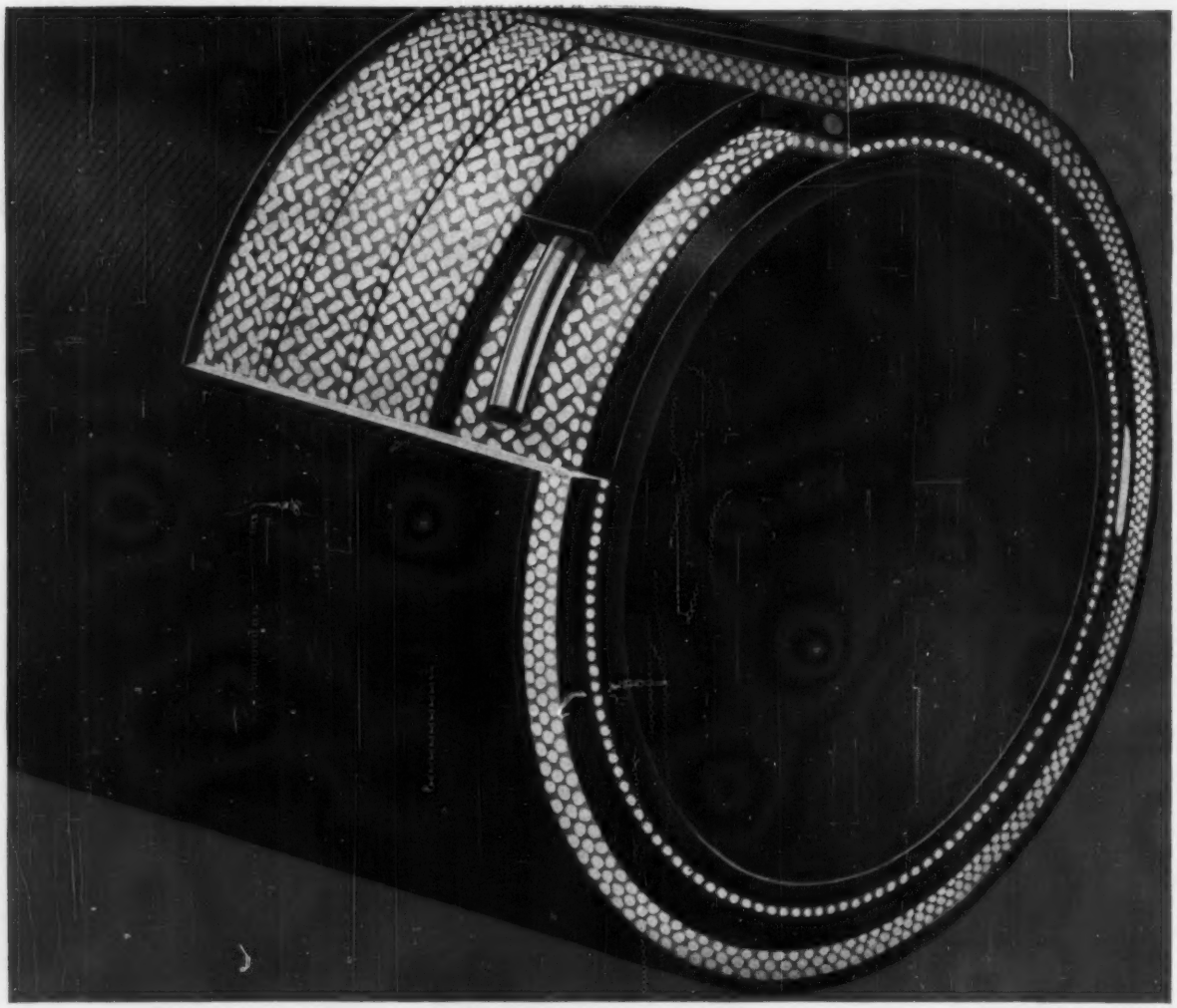
$C_5H_{10}O_5$. M.W., 150.13; M.P., 144-145 C; Color: white; Specific Rotation: +18.8°. Purity: 99/100%; Solubility: 54 g./100 ml. water at 20 C; soluble in pyridine and hot alcohol. Chemical properties: crystalline powder; odorless; very sweet taste; great chemical reactivity. Suggested uses: intermediate in xylose derivatives; sweetening agent in foods and beverages; in dietetic products for diabetics. Introduced as: product with new degree of availability. Availability: commercial quantities. Eastern Chemical Corp., Market Development Div.

ZEOLEX 80
(sodium silicoaluminate)

$Na_2O \cdot 1.5Al_2O_3 \cdot 17SiO_2 \cdot 8H_2O$. Sp.G., 2.1; pH, 6.5-7.5; G. E. Brightness: 91-93%; Mean Particle Diameter: 22 mm. Solubility: insoluble in water, alkalies and organics. Chemical properties: neutral pigment; does not affect the initial pH or create pH drift on aging; in high PVC paints excellent stability is obtained with no change in viscosity on aging; synergistic effect with titanium dioxide in latex paints; greater hiding power and brightness. Suggested uses: in emulsion paint systems. Introduced as: significantly new grade. Availability: commercial quantities. J. M. Huber Corp., Industrial Products Dept.

ZINC FLUOBORATE

Zn (BF_4); Constituents: 40% sol. of zinc fluoborate in water. M.W., 228.20; Sp.G., 13 lb./gal.; pH, 0.5. Chemical properties: releases BF_3 at 325 F. Suggested uses: curing resin on cloth for crease proof finishes. Introduced as: new chemical product. Availability: commercial quantities. The Harshaw Chemical Co., Organic Div.



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Technology
Newsletter

CHEMICAL WEEK
December 17, 1960

More details on the Catacarb gas sweetening system were revealed last week by inventor A. G. Eickmeyer (Kansas City, Mo.). The process, due for commercial operation soon, is described by Eickmeyer as essentially a catalyst-modified hot-carbonate process that can remove acid gases (e. g., hydrogen sulfide, carbon dioxide) from either natural or refinery off-gases. Like the hot carbonate systems, Catacarb uses an absorber (200-500-psi. operating pressure), along with a regenerator employing steam (5-25 psig.) to drive out the absorbed gases. Use of the catalyst (not specified, but said to be nontoxic), however, boosts the system's capacity 30-40%, and permits a 40% reduction in steam use. Catacarb is also said to remove 30-40% more carbon dioxide than hot carbonate systems, and when used with corrosion inhibitors, greatly reduce sludge formation.

•

Conventional gelatin emulsions of photographic film are by-passed in a vapor deposition process being readied for pilot-plant operation by Technical Operations, Inc. (Burlington, Mass.). In the process, coatings of silver halide are evaporated under vacuum onto either transparent film or opaque paper backings. The photographic surfaces obtained are said to be of high quality, with resolution more than adequate for use in microfilm applications.

Manufacturing costs are expected to be less with the new evaporated film. Also, due to the absence of an emulsion, processing is simplified so that dry pictures of good quality can be obtained in a few seconds by immersing the film or print paper in a single solution and then passing it over a heated roller to dry. Additional research is attempting to dye-sensitize the film to make it panchromatic, but speeds are still too slow for standard photography.

•

Process details on a new route to methacrylates were confirmed last week by Escambia Chemical Corp. (New York).

Instead of starting with acetone and hydrogen cyanide as do Du Pont and Rohm & Haas, Escambia's raw materials are isobutylene and nitric acid *(CW, Dec. 10, p. 25)*. The nitric is reduced to nitrogen tetroxide, which, in the key step, oxidizes isobutylene to α-methyl lactic acid. This acid is dehydrated to methacrylic acid and the last step is esterification to methyl methacrylate.

•

In a new type of steel converter, blasts of steam and oxygen replace air. The new unit operates like the Bessemer converter, oxidizes carbon out of molten pig iron with a submerged blast of gas, converting the iron into steel. The Steel Co. of Wales (SCOW), developer of the converter, currently has three of them in operation at its Abbey Works in

Margam, Wales, with a combined capacity of 11,500 tons/week. SCOW says its converter is cheaper to operate than an open-hearth steel furnace and that it produces steel with nitrogen content as low as 0.001-0.002%. High nitrogen content (0.02-0.03%) is a disadvantage of steels from Bessemer converters.

•

New ideas on space vehicle materials are being formed after study of the first living human cells to be recovered from a satellite.

Preliminary conclusions: specimens protected by aluminum received a lower radiation dose than those with lead shielding. Heavy metals such as gold or lead become a hazard during a solar flare because high-energy protons interact with these heavy metals to produce damaging X rays. Heavy shielding as protection for an astronaut against space radiations may not be necessary, at least for trips of less than 50 hours.

The Air Force School of Aviation Medicine (Brooks AFB, Tex.) made the studies on cells carried by the Air Force-Lockheed Discoverer XVII satellite launched Nov. 12 and recovered in mid-air two days later. By coincidence, one of the largest recorded solar flares occurred while the satellite was orbiting, thus giving the cells a maximum radiation dose.

•

A thin-film memory computer—which most of the computer industry has been racing to develop—is commercially available this week: Remington Rand's (a division of Sperry Rand Corp.) Univac 1107 computer. Using the thin-film technique in a control memory, the computer speeds data in and out of its storage section in a billionth of a second—about three times faster than the most sophisticated core memory computers.

Key to the thin-film technique in the Univac 1107 is a memory section composed of metal dots a few millionths of an inch thick that are impregnated on a thin glass plate. The dots are made by depositing vapors of iron, nickel, cobalt or other alloys in the presence of a magnetic field and under a high vacuum. These dots are then connected by multilayer metal strands printed onto plastic materials. In operation, the film works on the principle that it can be magnetized most easily in the direction of the magnetic field under which it was applied.

Like older models, the Univac 1107 is a digital machine that's suited for scientific computation, data analysis and various systems computations, including communication, switching, tactical data and control, inventory and scheduling.

•

A setback for a proposal to substitute coal for asphalt in blacktop roadbuilding came at the hands of the Pennsylvania state legislature in Harrisburg recently. A $150,000 fund allocated for a pilot plant to convert soft coal into a suitable road binder was returned to the state's general fund, when it was learned that only 10 tons/mile of coal could be used instead of a forecast 100 tons/mile.

WETstrez is RCI's new name for a group of highly efficient wet strength resins — formerly RCI BECKAMINE — that have years of proven performance in the paper industry.

Take WETstrez P-841-30. This modified urea-formaldehyde resin is specially tailored for use with deciduous wood pulps. WETstrez P-841 imparts wet strength, increases Mullen and dry tensile strengths, and aids in the retention of clay, starch and other beater additives.

Or, WETstrez P-682-35, another modified U-F resin. It is designed for optimum performance with coniferous wood pulps. In either product, the name WETstrez means more wet strength per dollar!

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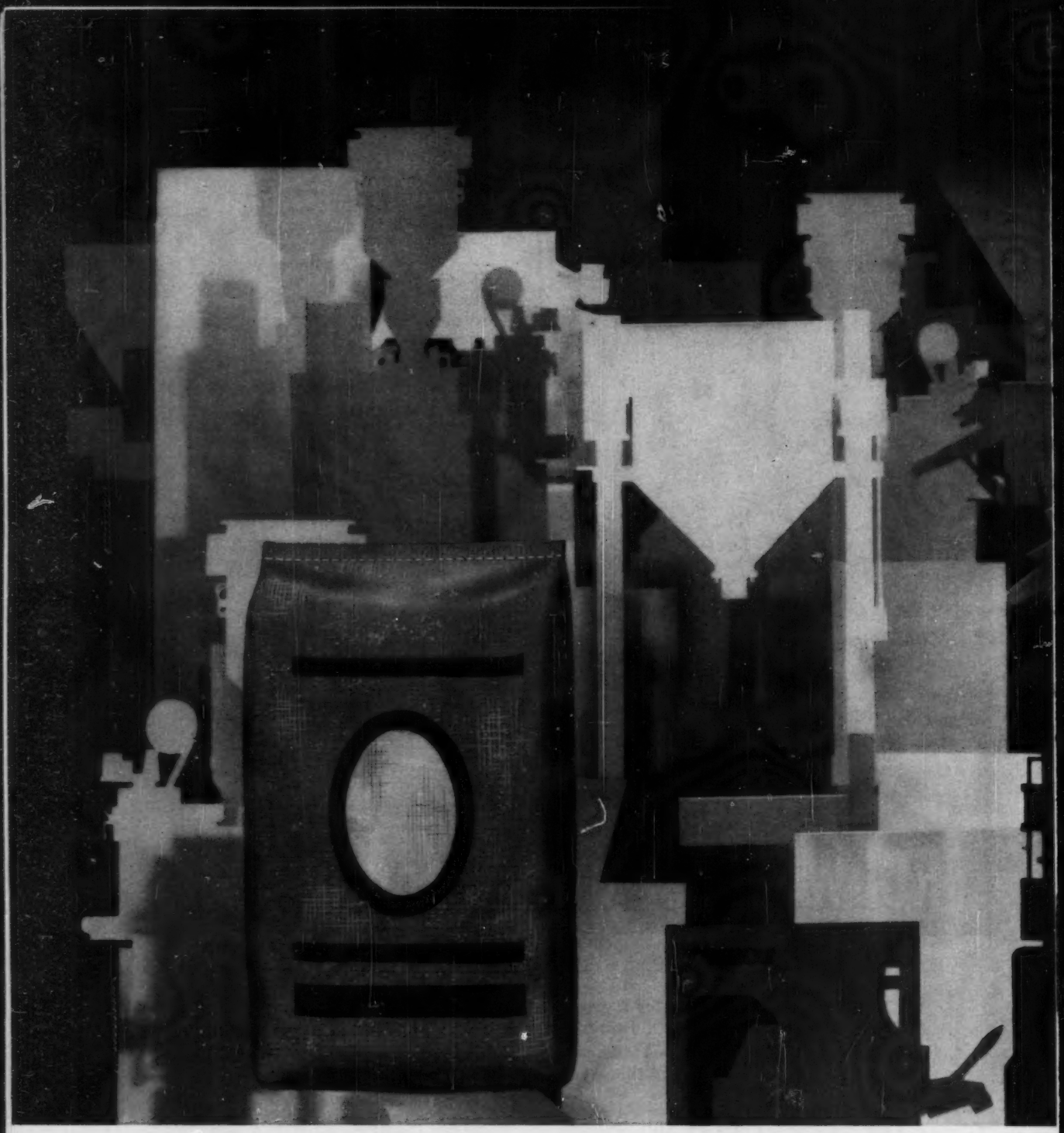
Sulfuric Acid • Methanol



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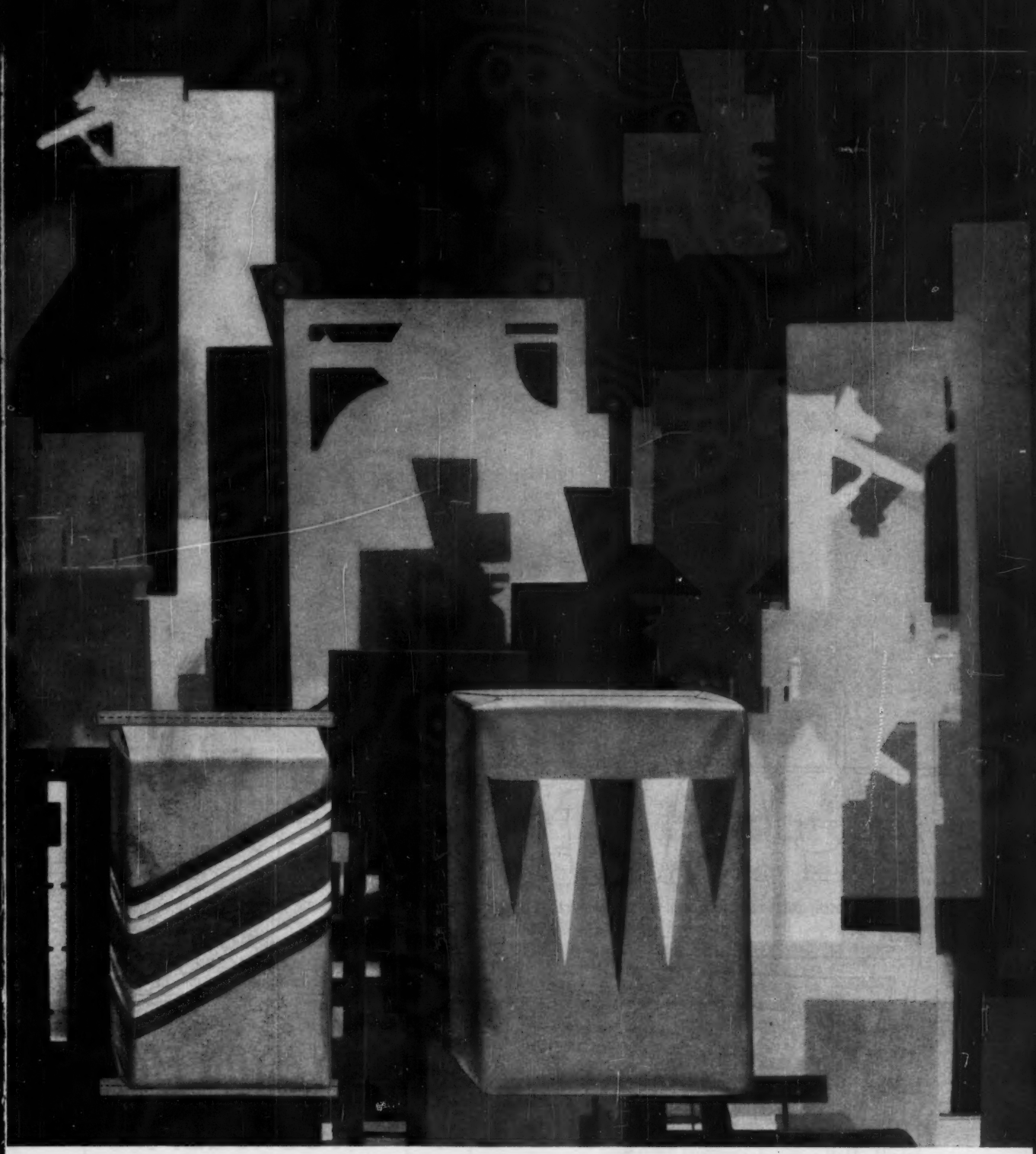

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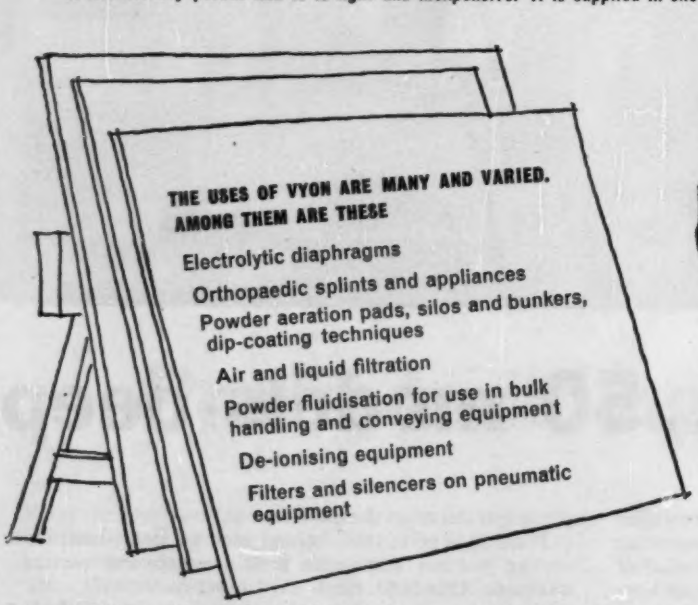

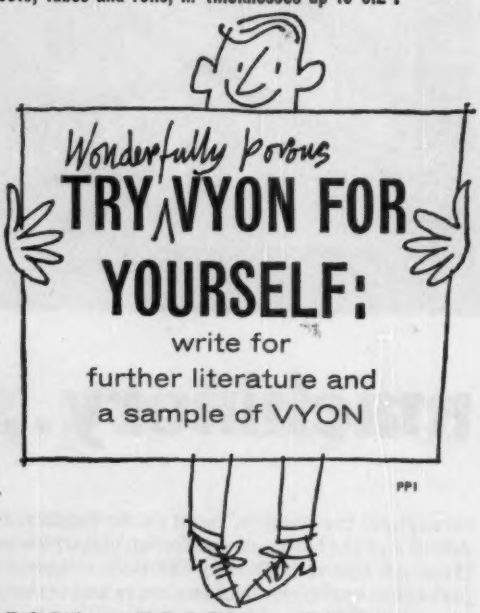

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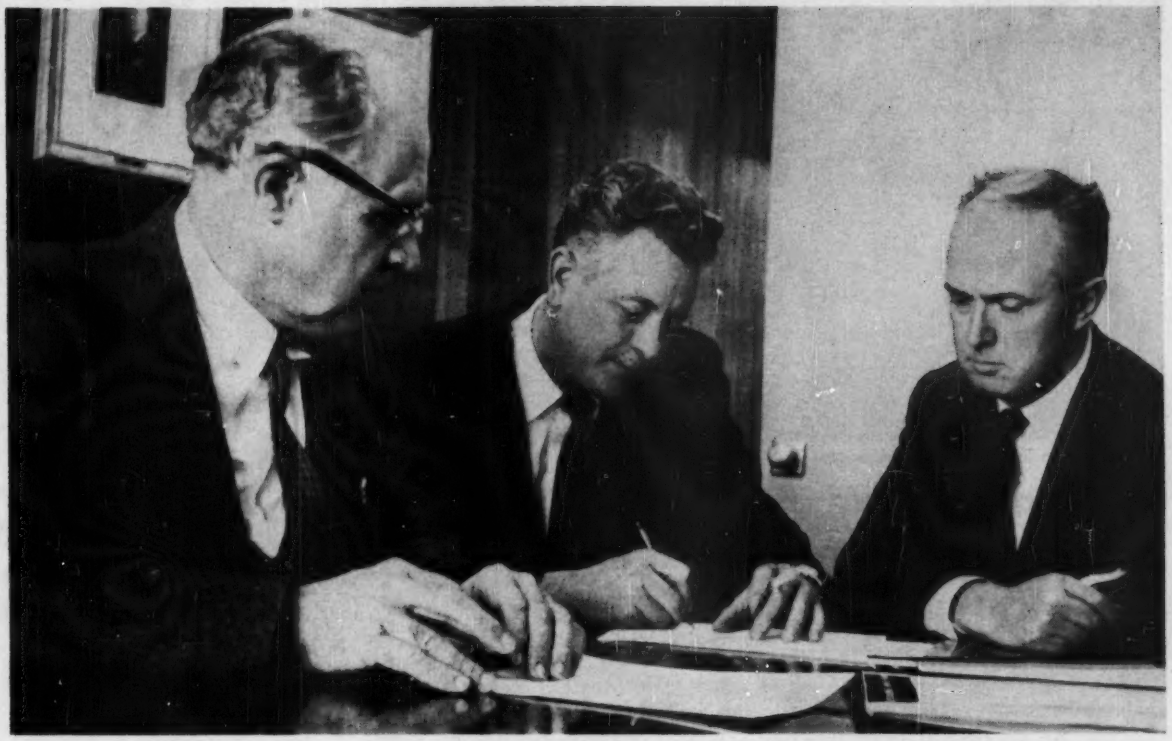

Nebraska's Finigan signs; Governor-elect Morrison (*left*) and MRI President Charles Kimball observe.

States Sign the Tab for Research

Three new contracts between the state of Nebraska and Midwest Research Institute (Kansas City, Mo.) are among the latest to be financed by a special state tax. Other states are expected to shortly emulate this novel plan for spurring industrially oriented studies of natural products.

Two of the three new contracts are concerned with starch utilization; the third covers a market study on fermentation-produced acids. These bring the total of Nebraska-sponsored contracts at four locations to 14 (*see table, p. 78*).

Last year the Nebraska legislature passed, by a whopping 40-3 margin, a new law calling for a "research tax" of 0.1 mill/dollar of assessed valuation of all taxable property in the state. All funds raised—an estimated $300,000/year over the next five years—are to be used for research projects aimed at finding commercial uses for Nebraska's products. Not included: conventional agricultural studies on increasing production.

One of the state's first projects under the new law—the castor bean program—has worked out so well the state is planning to increase the tax to 0.5 mill and extend the law's duration by 10 years. Now Iowa and Missouri are reportedly on the verge of adopting similar legislation.

Goal—New Uses: Main feature of the new research program: it will be aimed solely at finding and developing new commercial outlets for the state's surplus products (as well as tailoring old products and developing new ones for existing markets). Traditional research on agricultural products by the U.S. Dept. of Agriculture and state agricultural colleges, either is directed at increasing crop yields (most successful) or is carried out on a relatively fundamental plane. Nebraska's Governor-elect Frank Morrison pinpoints the importance of the new approach this way: "If we had given the same amount of money for research on crop use and market development as we have for production development, there would be no farm surplus problem today."

General line of action is to start with an initial exploratory contract on a given product to identify the most promising areas for further research. Development in these areas is carried out through one or more subsequent contracts. The criterion for further work is, of course, that there be reasonable prospect of ultimate commercial payoff.

Patent Protection: Nebraska wants to work with industry in carrying out its programs, and the state offers a new deal on patent rights as an inducement to private firms. A chief hindrance to gaining industrial cooperation had been the requirement that any patents developed under work supported by USDA or other federal agencies be made available to the public for a nominal charge. Thus: a company could not hope for exclusive rights from any work done on such a project.

Although nothing specific is written

Where Nebraska's Research Projects Will Go:

Midwest Research Institute
- Industrial utilization of wheat gluten ($22,000)
- Market potentials for high-amylose (and other) corn products ($24,500)
- Studies on the utilization of starch ($24,200)
- Economic feasibility of leathermaking in Nebraska ($8,100)
- Industrial utilization of amylose ($26,800)
- Alkylation reactions of starch (Linn reactions) ($29,800)
- Analysis of market opportunities for organic acids produced by fermentation processes ($6,800)

Institute of Paper Chemistry
- Effects of water conditions on the cooking, dispersion and papermaking properties of starch ($20,000)
- Development of improved starch products with increased versatility in papermaking ($25,000)
- Modification of dry-milled starch products for use in papermaking ($24,000)

University of Nebraska
- Breeding high-amylose corn for industrial utilization ($303,930)
- Enzymatic modification and conversion of starch for new industrial uses ($45,500)
- Development of castor bean production practices in Nebraska ($74,500)

South Central Nebraska Agricultural and Industrial Corp.
- Feasibility of castor beans as a commercial crop in Nebraska (no specified amount)

into the Nebraska law concerning patent rights, neither is there any legal obstacle to the state's offering patent protection to companies that work for it. State Agriculture Director Pearle Finigan, who is responsible for letting the contracts, makes it clear that industry's patent rights will be fully protected.

To clear up any question on the matter, the legislature is expected to pass a bill at its next session that specifically gives the agriculture director authority to administer patent questions in any way needed to attract industry.

Working with Industry: Joint sponsorship of research projects is another way in which Nebraska hopes to cooperate with industry. The first project of this kind is likely to be a study of castor bean utilization, to be carried out at MRI and financed by equal, $34,000 grants from the state and from Baker Castor Oil Co. (Bayonne, N.J.), an affiliate of National Lead Co. This contract is now before the state attorney general, whose approval is expected shortly. The agreement would call for Baker to own any patents jointly with Nebraska, to share equally in any royalties and to have

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002

first opportunity for exclusive licensing. In return, the company would release to Nebraska all its previous research on the subject for use in carrying out the project. It's expected that the firm will build a castor bean processing plant in Nebraska in the next year or two.

Snowballing Idea: Early success with castor beans has given the state officials confidence in the approach. An experimental crop of castor beans grown this year (1,500 acres) sold for $6.30/cwt., enough to encourage the planting of 15,000 acres next year. Proceeds from the new crop are expected to be $1.5 million/year, an amount equal to the sum to be spent for research in the next five years under the existing law.

Since other states began showing interest, Nebraska earlier this year helped form the Agricultural Products Utilization Assn., a nonprofit corporation devoted to exchange of product utilization information and to promotion of state-supported utilization research. APUA will also try to get matching federal funds and will provide a coordinating body for state research projects. Iowa has officially joined the association, and Missouri, Kansas, Colorado, Minnesota, New Mexico, Wyoming and South Dakota have had unofficial representatives at several meetings.

Iowa and Missouri are almost certain to pass laws similar to Nebraska's in the next session of their legislatures, and Colorado is a strong possibility to enact such legislation.

What They're Doing: Nebraska currently has 14 projects going, including seven at MRI, three at the Institute of Paper Chemistry (Appleton, Wis.), three at the University of Nebraska (Lincoln) and one at South Central Nebraska Agricultural and Industrial Corp. (Hastings).

Starch utilization is by far the subject under most intensive study, with nine contracts totaling $523,230 currently in force. Two castor bean studies (not counting the joint project with Baker) include one for $74,500 and another with no specified amount.

A $22,000 wheat gluten study has already turned up experimental quantities of a transparent, water-soluble film; $8,100 is being spent on a study of the feasibility of leathermaking in Nebraska (to utilize the large quantities of hides produced in the state's

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U.S.I. CHEMICAL NEWS

December 17 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1960

Polyethylene Coatings Cut Fertilizer Loss in Soil

It has been reported recently that coating conventional fertilizers with polyethylene slows down the rate at which they release constituents to the soil. In experiments, a coated fertilizer lost only 5.4% of its potassium, while uncoated fertilizer lost 81.3% in the same period.

Most fertilizer salts dissolve very rapidly in most soils, and, if not used, can be lost. Fertilizer is generally applied when a crop is planted or starts growing, when its nutrient needs are small, and not at midseason, when the nutrients are most needed by the crop. It is felt that by coating the fertilizer, and metering out the nutrients more nearly as plants require them, a more efficient use of fertilizer would result.

New Denaturant Approved For SDA-40 Formulations

The Alcohol & Tobacco Tax Division has just approved a third denaturant for use in specially denatured alcohol (Formula No. 40) — a synthetic organic called "Bitrex," chemically, benzyldiethyl (2:6-xylylcarbamoyl' methyl) ammonium benzoate.

"Bitrex" is much more bitter than brucine or quassin, the two denaturants used exclusively in SDA-40 until now. In addition to ⅛ gal. tert-butyl alcohol, only ¼ oz. of "Bitrex" is required to denature 100 gallons of ethyl alcohol, as against 1½ oz. for the other denaturants.

There are now four SDA-40 formulations approved by ATTD. U.S.I. designations are as follows:

SD-40-1	1½ oz. brucine alkaloid
SD-40-2	1½ oz. brucine sulfate
SD-40-3	1½ oz. quassin
SD-40-4	¼ oz. "Bitrex"

Cl_2-N_2 Mix Suggested for Degassing Aluminum Melts

A new treatment has been proposed for removing dissolved hydrogen and included oxides from molten aluminum. It employs a mix of 10% chlorine—90% nitrogen.

In melting and casting aluminum, oxides must be eliminated and hydrogen controlled. Chlorine treatment is regularly used but, in an attempt to eliminate fuming and corrosion problems, nitrogen has been tried. However, results from nitrogen flushing vary from day to day.

Experimenters have determined that 10% chlorine and 90% nitrogen gives the consistent results of chlorine alone, releases no fumes, eliminates corrosion.

U.S.I. Expands Program to Give Handling Help to Sodium Users

New Hydrocarbon Desulfurization Process, Other New Uses Spur Interest in Sodium Equipment, Maintenance, Safety

Because of the interest in new uses of sodium such as U.S.I.'s new, economical sodium process for reducing thiophene levels in hydrocarbons, the company expects increased interest in its program of plant design assistance to sodium users. U.S.I.'s sodium production engineers have often helped customers and prospects set up and maintain trouble-free operation in plants using sodium. The company now plans to make more plant men available to work on these problems.

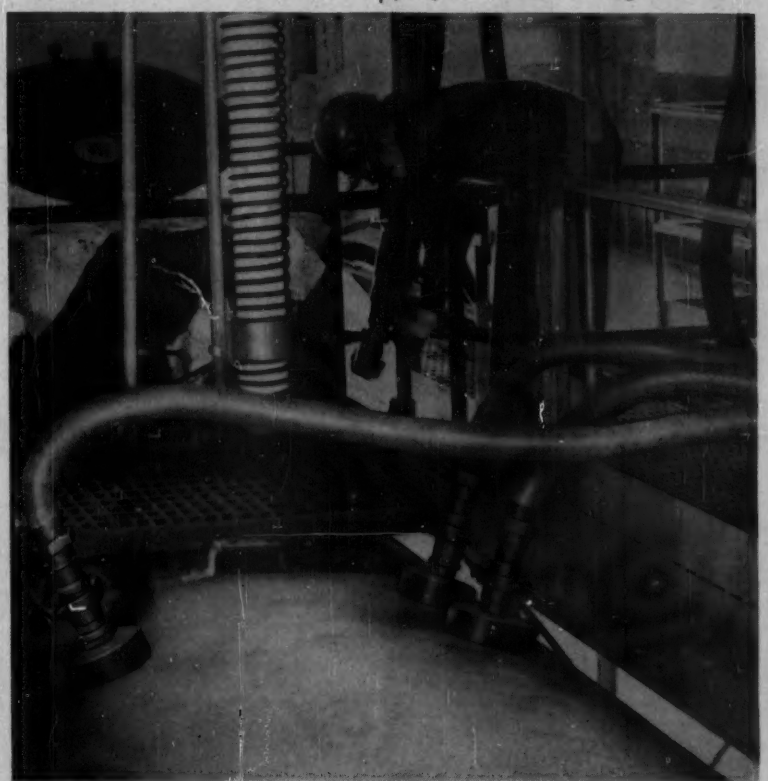
Layout and Equipment Assistance

Engineers from U.S.I.'s Ashtabula, Ohio, sodium plant can and do provide engineering help in laying out sodium processing and handling equipment. Typical examples are tankcar unloading stations, solid pack melting layouts, design and layout information on sodium lines, filters, pumps, valves and metering.

MORE

New Caustic Soda Book Just Issued by U.S.I.

Facts about caustic soda are covered in a new, 36-page booklet now offered by U.S.I. Up-to-date, practical information on properties, applications, methods of analysis, shipping, handling procedures, and safety measures is included. There are many graphs and tables, an extensive bibliography, and a complete index. For your copy, address Technical Literature Dept., U.S.I. Chemical News, 99 Park Ave., N. Y. 16, N. Y.



In typical sodium tankcar unloading station, designed by U.S.I. plant engineers, molten sodium discharges through vertical pipe heated by induction coil. Hot oil flows into tankcar coils through metal hoses.

December 17 ★ **U.S.I. CHEMICAL NEWS** ★ 1960

CONTINUED

Sodium Handling

The Ashtabula men, from their own production experience, have the specialized knowledge required for selecting proper types of pipe, valves, flanges, gasketing materials, line heating devices, and other accessories. On many occasions, they have been able to give a customer the maximum of troublefree operation by sharing this experience with them.

In addition to offering initial plant design assistance, U.S.I. engineers will trouble-shoot existing sodium handling equipment, and can usually make recommendations that will enable customers to correct troublesome situations at minimum expense.

Safety and Maintenance Instruction

In many instances, safety instructions are needed by customers. The information which U.S.I. plant men have supplied on the safe handling of sodium, and disposal of scrap, to customers' safety engineers and operating personnel has proved very helpful. This has done much to allay the fears some people seem to have in handling sodium.

One of the most common aids to customers is instruction in the cleaning of sodium drums, valves, fittings, pipe lines and filters. Very simple procedures are involved, but they must be seen at first hand to minimize problems.

Customers often require assistance in the repair of sodium valves and other process accessories involved in the handling of sodium. Here again U.S.I. plant men are able to make recommendations and supply definite information and specifications.

U.S.I. also makes available a comprehensive brochure, "Handling Metallic Sodium on a Plant Scale." to help customers and prospects with processes involving the metal. The company recommends that this brochure be studied first, after which the U.S.I. sodium plant engineers can be consulted on handling problems.

Role of Patent Department In Chemical Research Stressed at ACS Symposium

In a "Planning for Research" Symposium held by the ACS Division of Chemical Marketing and Economics on Sept. 13, Dr. Janet Berry, Manager of U.S.I.'s Patent Department, discussed how close cooperation between Research and Patent Groups can assure best results from a company's research and development program.

In the initial planning stage of a project, Dr. Berry pointed out, a Patent Department *informed of the plan* can search patents and literature thoroughly to acquaint research management with all of the prior art. This prevents costly duplication of work, and provides a complete foundation on which the research group can build. The savings in time and money can be enormous.

In the active laboratory stage, Dr. Berry emphasized, Research can not always know just what should be patented. If complete reports on *all* developments are sent to the patent group for evaluation during this stage, the patents applied for can be of greatest value to the company.

In the final commercialization stage, Dr. Berry concluded, further benefits can be obtained by reporting all design or process changes during scale-up to the Patent Department. These changes can then be examined for further important innovations which may be patentable.

Dr. Berry

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

New anti-static spray suggested for use during printing and converting of plastics, paper, textiles; during chemical processing; on instruments, etc. Said to chemically neutralize static generated from atmosphere or friction. **No. 1660**

Infrared spectrophotometers, gas chromatography instruments and accessories now being leased to users on three-year basis, after which users may renew lease or buy instruments at small percentage of original cost. **No. 1661**

Fertilizer-grade ammonium nitrate is subject of new manual now available at nominal cost. Covers recommended procedures for proper packaging, handling, transportation, storage—at all stages from manufacturer to consumer. **No. 1662**

Advantages of bulk handling of polyethylene resins discussed in new, 24-page booklet. Analyzes in detail—with help of photos, diagrams, charts and tables—economics of bulk handling in differing situations. **No. 1663**

Titanium welding is subject of new booklet now being sold. Discusses best methods for welding piping and tubing by gas tungsten-arc process. Information has been gathered from laboratories, companies, colleges and literature. **No. 1664**

Synthetic magesium silicate covered in new data sheet. Said to be efficient purifying agent for contact filtration refining of organics such as alcohols, aldehydes, esters, ethers, halogenated hydrocarbons, monomers, silicones, syrups, solvents. **No. 1665**

Self-emulsifiable sperm oil, recently developed, is said to give permanent emulsions by agitating 5-10% of product with 95-90% hot or cold water. Offered for cutting oils, textile and leather oils, petroleum additives, etc. **No. 1666**

"Properties and structure of polymers" a new book now being sold. Explains important features of mechanical behavior of polymers in terms of fundamental principles of molecular behavior and structure. **No. 1667**

New phosphating cleaner and metal conditioner reported to remove rust, corrosion, mill-oil in one step; to retard corrosion and oxidation; to deposit new type colorless phosphate coating on surfaces. Very good rinsability claimed. **No. 1668**

New high-melting synthetic wax (M.P. 156°C, 313°F) commercially available. Is hard brown wax with very high flash point and good electrical insulating properties. Insoluble in all solvents at ordinary temperatures. **No. 1669**

meat-packing operations); and a $6,800 market study has been initiated on organic acids that can be made by fermentation (citric, fumaric, gluconic and itaconic).

Starch Studies: Most interest in starch is centered on the amylose variety, which normally makes up 25% of the starch content of corn. Amylose is a linear polymer, with potentialities for industrial use. A five-year contract totaling $303,920 at the University of Nebraska—the state's largest single contract—is aimed at developing new hybrids with higher amylose content. Past research (*CW, Dec. 13, '58, p. 113*) has raised attainable content to 55-60%; 60-70% is forecast for '66, 70-80% for '68. Preliminary studies by MRI have narrowed the fields of best potential application for amylose to films (both soluble and insoluble) and adhesives.

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opment center. Linde also has an option on a site for the proposed R&D center at an undisclosed location in northern New Jersey. The center Linde has in mind reportedly would involve an expenditure of $20 million or more over a period of years.

• Magnaflux Corp. (Chicago), a wholly owned subsidiary of General Mills, has acquired Metal Control Laboratories (Los Angeles) to round out Magnaflux' facilities for integrated nondestructive, metallurgical and physical testing.

• Six Canadian uranium mining companies have set up the Canadian Uranium Research Foundation to find new uses for uranium. Participating are Gunnar Mines, Rio Algom, Denison, Faraday, Bicroft and Eldorado. The foundation will spend about $250,000/year on projects such as the use of uranium in steel alloys and in semiconductors.

• Nuclear Enterprises Ltd. (Winnipeg, Can.) is building facilities that will enable it to combine headquarters and research and development laboratories.

PRODUCTS

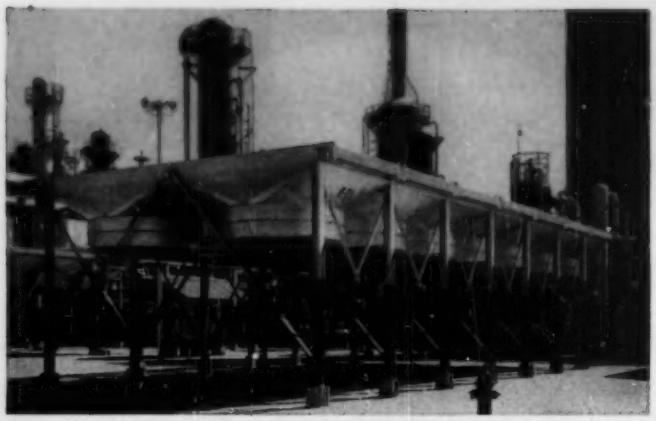
'Atomized' Metals: New metal powders made by "atomization" are offered by Federal-Mogul-Bower Bearings, Inc. They include stainless steel, commercially pure iron, silver, copper, aluminum-copper-nickel alloys, and cobalt alloys. They're for fuel cells, thermonuclear devices, semiconductors, etc., according to Federal-Mogul Division Research and Development (P.O. Box 1048, Ann Arbor, Mich.).

•

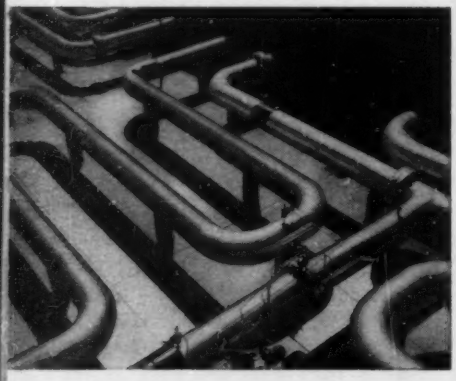
Drug Entries: Benzphetamine (Didrex) is a new appetite suppressing drug developed by The Upjohn Co. Kalamazoo, Mich.). It is now under clinical study.

Racobalamin-57 is a new radiopharmaceutical said to make possible a safer and more efficient use of the Schilling test for diagnosing pernicious anemia. It is supplied as a solution or capsule form of vitamin B_{12} with a cobalt-57 radioactive label. Source: Abbott Laboratories (North Chicago).

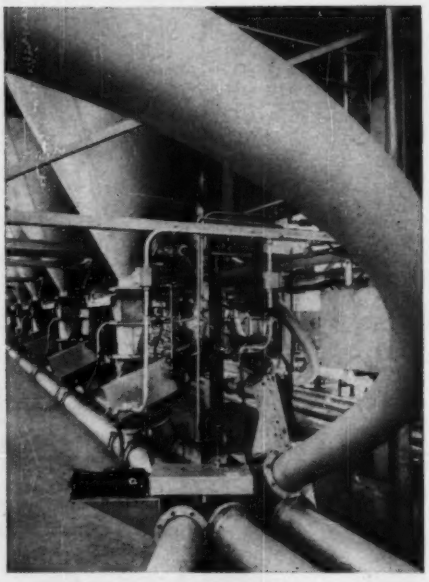
Crystalline glucagon, a hormone of the pancreas, is now offered by Eli Lilly & Co. (Indianapolis, Ind.) for treating hypoglycemic shock.



Below, aluminum's ability to maintain its serviceability and excellent appearance in chemically contaminated atmospheres is utilized here in Al-Cor-Jac alclad aluminum jacketing—manufactured by Insul-Coustic Corporation, Maspeth, Long Island, N.Y.



Pictured above is a Solo-aire cooling unit manufactured by Hudson Engineering Corporation, Houston, Texas. Here the excellent heat transfer properties of aluminum made it a natural choice for process cooling. Of important added value are the excellent corrosion resistance of aluminum and its outstanding low temperature properties.



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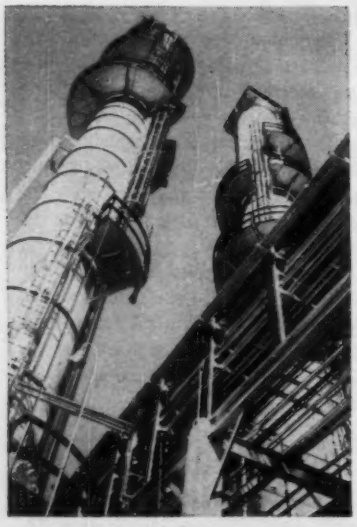

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- ☐ 10197 Aluminum Pipe and Fittings
- ☐ 10418 Alcoa Unitrace: Combines Piping and Tracing in One Unit
- ☐ 514 Alcoa Duotrace Technical Report
- ☐ 10270 Alcoa Utilitube
- ☐ 10460 Process Industries Applications of Alcoa Aluminum
- ☐ 11453 Solving Refinery Corrosion Problems with Aluminum
- ☐ 20849 Resistance of Aluminum Alloys to Weathering and Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres
- ☐ 20437 Aluminum Alloy Heat Exchangers in the Process Industries
- ☐ 19416 Brazing Alcoa Aluminum
- ☐ 19415 Welding Alcoa Aluminum
- ☐ 19051 Alcoa Aluminum Handbook

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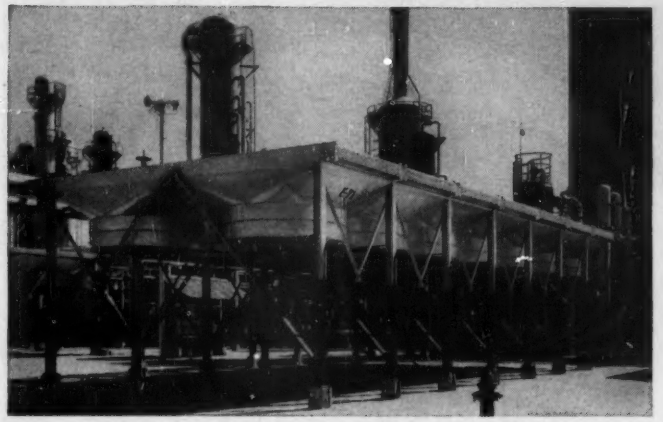

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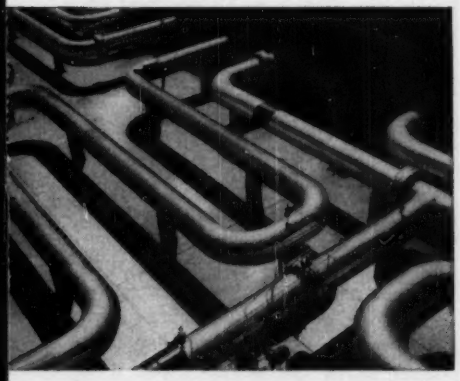

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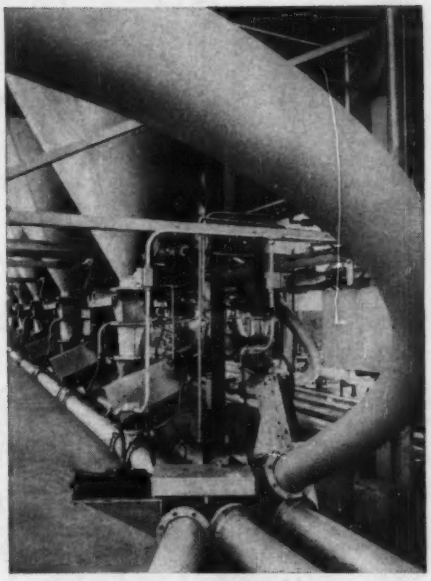

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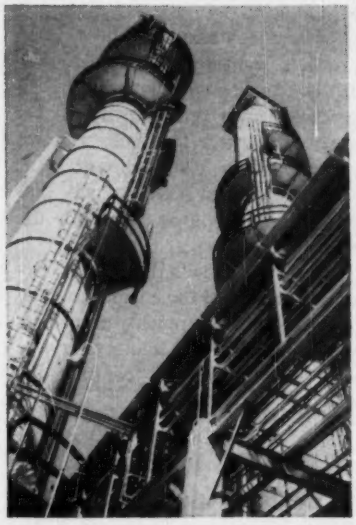

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New Power Source

Westinghouse showed off a new device for electric power generation at last week's 15th annual meeting of the American Rocket Society in Washington.

It's based on the principle that heated ceramic-metal combinations produce electricity. Westinghouse calls this principle the "Austin effect"; and the device that produces it is called an "Austin cell" after developer B. O. Austin, a retired Westinghouse engineer now serving as an electrical engineering consultant to the company.

The cell consists of iron, coated with vitreous enamel, then covered with a thin silver coating. Heated to 200-750 C, it produces power levels of 16 milliwatts/square inch of the silvered surface. Roughly half this output has been measured up to one hour after the heat was removed. No temperature differential is required such as that needed for thermoelectric or thermionic devices, the company says.

High reliability, low cost and long shelf-life of the device make it a highly inportant discovery, Westinghouse believes.

The company sees initial application in rockets, utilizing waste heat to produce electrical power, possibly by integrating Austin cells into the rocket nozzle structure. The weight-power ratio may reach 5 lbs./kilowatt hour, one of the highest yields of any battery, if Westinghouse's hopes for the device are realized.

Output of the cells depends mainly on the thickness of the enamel coating. Westinghouse has applied for patents and is talking with the military services about a developmental contract for the cells.

EXPANSION

• Archer - Daniels - Midland will build a new research center on a 73-acre tract at Bloomington, Minn., a suburb of Minneapolis. A staff of 250 will do research there on resins, plasticizers, modified fatty acids and oils, foundry products, and the like. The new center will consolidate much of ADM's research.

• TFC of Canada Ltd. (Toronto) is building a laboratory at its Cornwall cellulose packaging plant.

• Dresser Products, Inc. (Great Barrington, Mass.), has expanded its

laboratories for research in nuclear and space materials.

• Bjorksten Research Laboratories (Madison, Wis.) has extended its facilities to include custom organic syntheses.

• American Can Co. (New York) has set up four divisions in the Research and Development Dept.: Research (Barrington, Ill.), Technical Service, New Products, and Machinery Development.

• Photostat Corp. (Rochester, N.Y.) is adding to its facilities and staff for research and development in microfilm, photocopy, and the like.

• Philadelphia Industrial Development Corp. will build a $2.5-million research center for Franklin Institute on a site adjacent to the Institute's main building in Philadelphia. The 120-000-sq. ft. building, to be completed in late '62, will be leased by the institute.

• A new technical center at The Chemstrand Corp. (Decatur, Ala.) will be ready for occupancy by late Jan. '61. It will be permanent headquarters for the firm's Engineering and Development Dept., Applications Research and Service Dept., and other groups closely associated with these activities.

• Construction of a $750,000 development laboratory at the Oak Ridge Gaseous Diffusion Plant (Oak Ridge, Tenn.) is under way. It will employ about 40 R&D personnel.

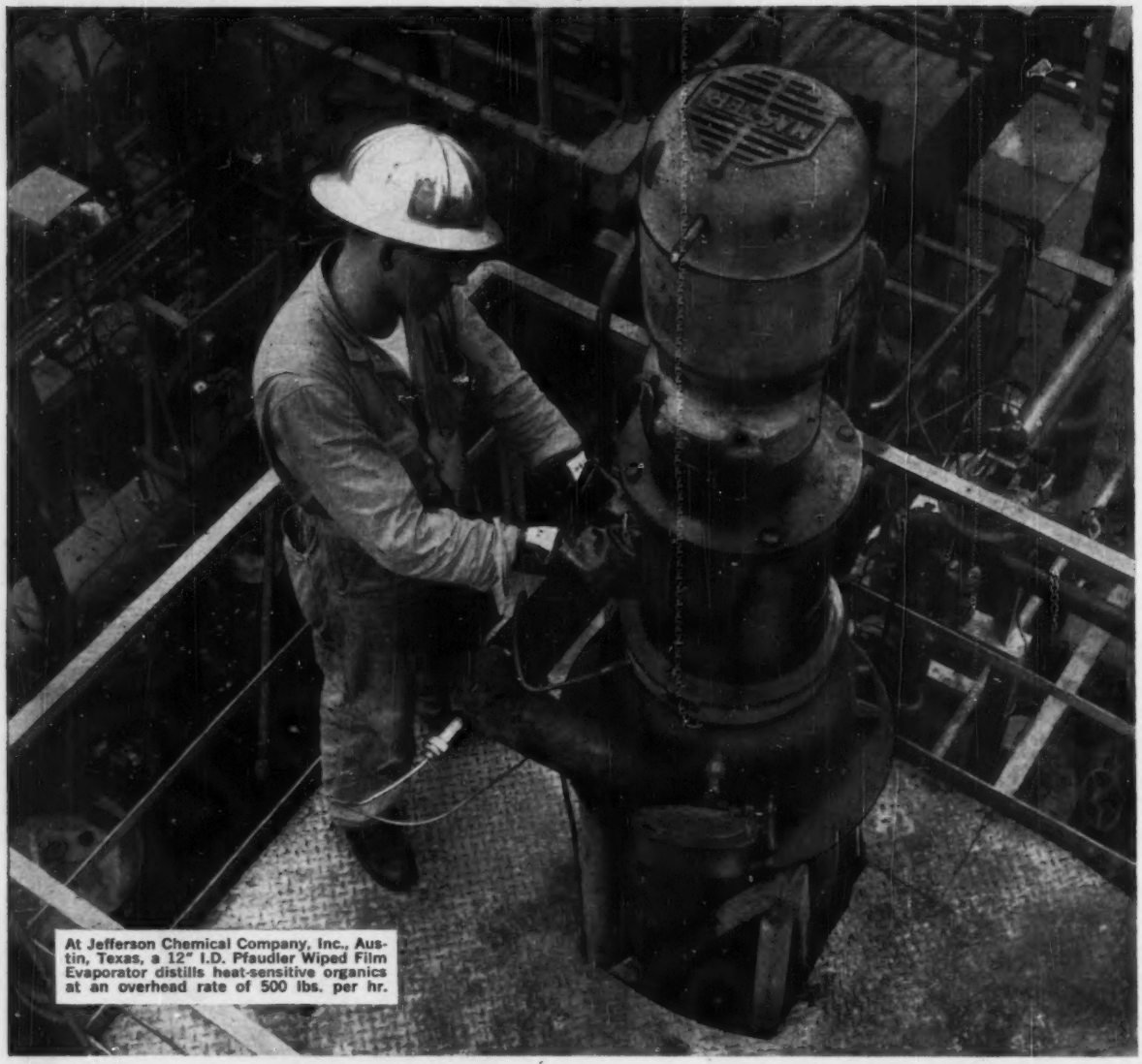
• Metal & Thermit Corp. (Rahway, N.J.) has opened a new high-temperature laboratory for inorganic chemical, ceramic, metal and mineral research. Feature: circular tunnel kilns, designed and built by M&T, that automatically load and fire sample tiles according to a precisely regulated firing schedule.

• B-D Laboratories, Inc. (Rutherford, N.J.), is a new company that unites the research, financial control and production of Baltimore Biological Laboratory, Cappel Laboratories and Falcon Plastics.

• Edw. Renneburg & Sons Co. (Baltimore) has completed a new research and development center for studies in blending, granulating, liquid extraction, drying and calcining.

• The Linde Co., division of Union Carbide, is seeking to renew the options it holds for the purchase of 367 acres in Clarence, N.Y., as a possible site for a research and devel-

FLUIDICS* AT WORK



At Jefferson Chemical Company, Inc., Austin, Texas, a 12" I.D. Pfaudler Wiped Film Evaporator distills heat-sensitive organics at an overhead rate of 500 lbs. per hr.

HEAT-SENSITIVE ORGANICS NO PROBLEM with this Wiped Film Evaporator

Jefferson Chemical distills heat-sensitive, high-boiling organics in it with yields of 42 lbs. per hr. per sq. ft. of heat transfer area.

They operate their Pfaudler® Wiped Film Evaporator at 2mm Hg and report unit is simple to clean and maintain. "Actually the over-all performance of this evaporator is superior to any expectations we had," states Jefferson Chemical.

Mechanical wiping. A *true* wiped-surface evaporator, it uses centrifugal force to hold four free-floating wipers in contact with the internal heated wall. Slots in the wipers *prevent* curl and spread product in a thin, uniform film to assure full use of heat transfer area.

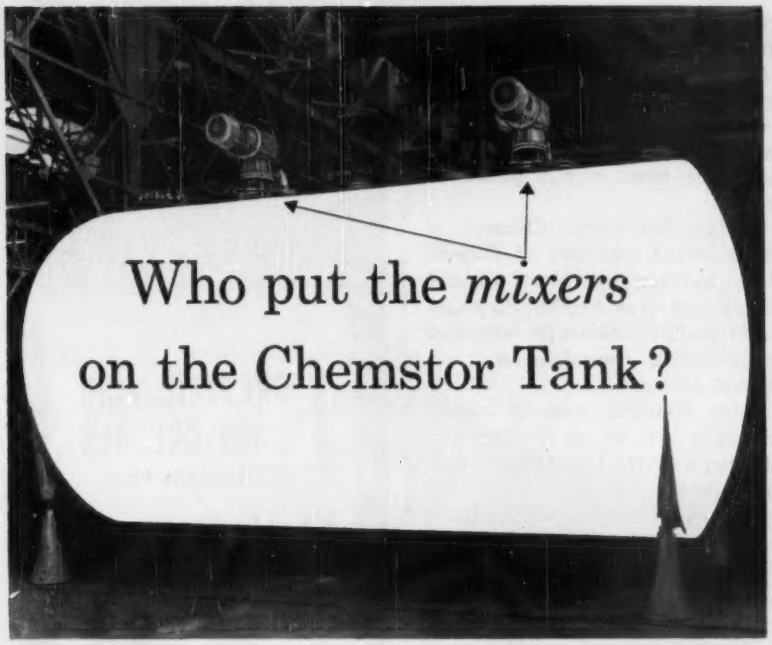
This construction also makes the Pfaudler unit well suited to handling products that are highly viscous or low in thermal conductivity.

Internal condenser. The "U"-tube bundle is *inside*, so there's a negligible pressure drop between evaporating and condensing surfaces. With an internal condenser, you also need less floor space and save on ductwork, piping and installation costs.

Functional simplicity. There's no bottom bearing in any Pfaudler evaporator, so you don't worry about trouble or maintenance. With some products you clean by running a solvent through. For visual inspection or more thorough cleaning, just break vacuum and lift drive, top head, and rotor out as a single unit.

Choose from 12" I. D. models (4, 9 or 12 sq. ft. of evaporating area) or 36" I. D. models (30, 50, 75 and 100 sq. ft.). If you need larger sizes, we make them on a custom basis.

Test the performance of *your product* in the Wiped Film Evaporator at the Pfaudler Test Center. Or get more details from Bulletin 991. Write to the address shown on the facing page.



Who put the *mixers* on the Chemstor Tank?

We did. Which should interest you if anything you store tends to *separate out* on standing.

Agitation as an integral part of Pfaudler Chemstor Tanks should prove particularly attractive if the products you handle are *corrosive*, since the tanks are of Glasteel—glass inside, steel outside—and resist attack from all acids (except HF) and most alkalies.

Initially, you will be able to get 32" or 36" turbines installed in 5-, 10-, or 15-thousand-gallon tanks operating at 55 rpm with our 4TW drive.

Chemstor Tanks are an excellent investment for two reasons. With any corrosive, unusually *long service life* is the payoff. And in sizes from 10- to 35,000-gallons, regardless of what you store, savings are immediate, since the *costs are lower* than for stainless.

Glasteel is hard, nonporous and smooth, so there's little chance for build-up, even with sticky substances. And the inert glass product-contact surface protects against contamination.

Your questions on applications, availability and other uses for Chemstor Tanks, complete with agitation, will be answered promptly. Send your questions to the address at the bottom of this page.

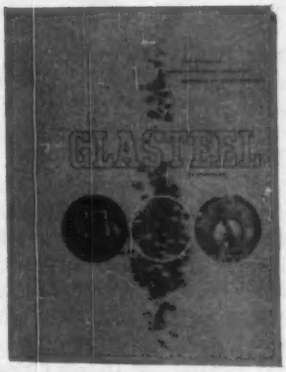
NEW BULLETIN—Glasteel, the Material of Construction

Just off the press is our four-color Bulletin 985, documenting the characteristics of Glasteel 59.

Of its 20 pages, 16 are devoted to *technical data* on specifications, thermal shock, operating temperatures, heat transfer, alkali resistance, acid resistance, and corrosion evaluation facilities.

This is the first time all pertinent data on Glasteel have been brought together in a single brochure. The results are impressive. Quite possibly this bulletin will suggest ways in which you can put this material of construction to use—reducing costs, improving service life of equipment, protecting product purity.

We think you'll find Bulletin 985 a worthwhile addition to your file. Write for your FREE copy.

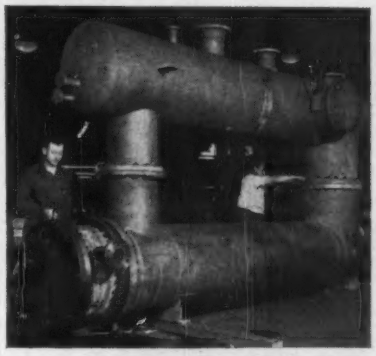


When your heat exchanger needs are very "special"...

Bring them to us. We may respond with an all-stainless unit like this one. It is an 840-square-ft. shell-and-tube exchanger with 30-inch-diameter shell, 16-feet long, for operation at 650°F, 75 psi. Tubes are made of type 316, and the shell is E.L.C., grade 304.

Or we might recommend components of titanium, zirconium, tantalum, Glasteel, nickel, Inconel, Monel, Hastelloy, or impervious graphite.

Since we fabricate, and are equally at home with the performance characteristics of all of these materials, you get the obvious benefit of an impartial design proposal. Often the answer to your special problems will be a *combination of* materials.



The intent is always to provide the optimum design in terms of heat transfer efficiency and corrosion resistance, at the *lowest* cost.

Tell us your problem. Or ask for Bulletin 949.

Please address all inquiries to our Pfaudler Division, Dept. CW-120, Rochester 3, N. Y.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes

RESEARCH

opment center. Linde also has an option on a site for the proposed R&D center at an undisclosed location in northern New Jersey. The center Linde has in mind reportedly would involve an expenditure of $20 million or more over a period of years.

• Magnaflux Corp. (Chicago), a wholly owned subsidiary of General Mills, has acquired Metal Control Laboratories (Los Angeles) to round out Magnaflux' facilities for integrated nondestructive, metallurgical and physical testing.

• Six Canadian uranium mining companies have set up the Canadian Uranium Research Foundation to find new uses for uranium. Participating are Gunnar Mines, Rio Algom, Denison, Faraday, Bicroft and Eldorado. The foundation will spend about $250,000/year on projects such as the use of uranium in steel alloys and in semiconductors.

• Nuclear Enterprises Ltd. (Winnipeg, Can.) is building facilities that will enable it to combine headquarters and research and development laboratories.

PRODUCTS

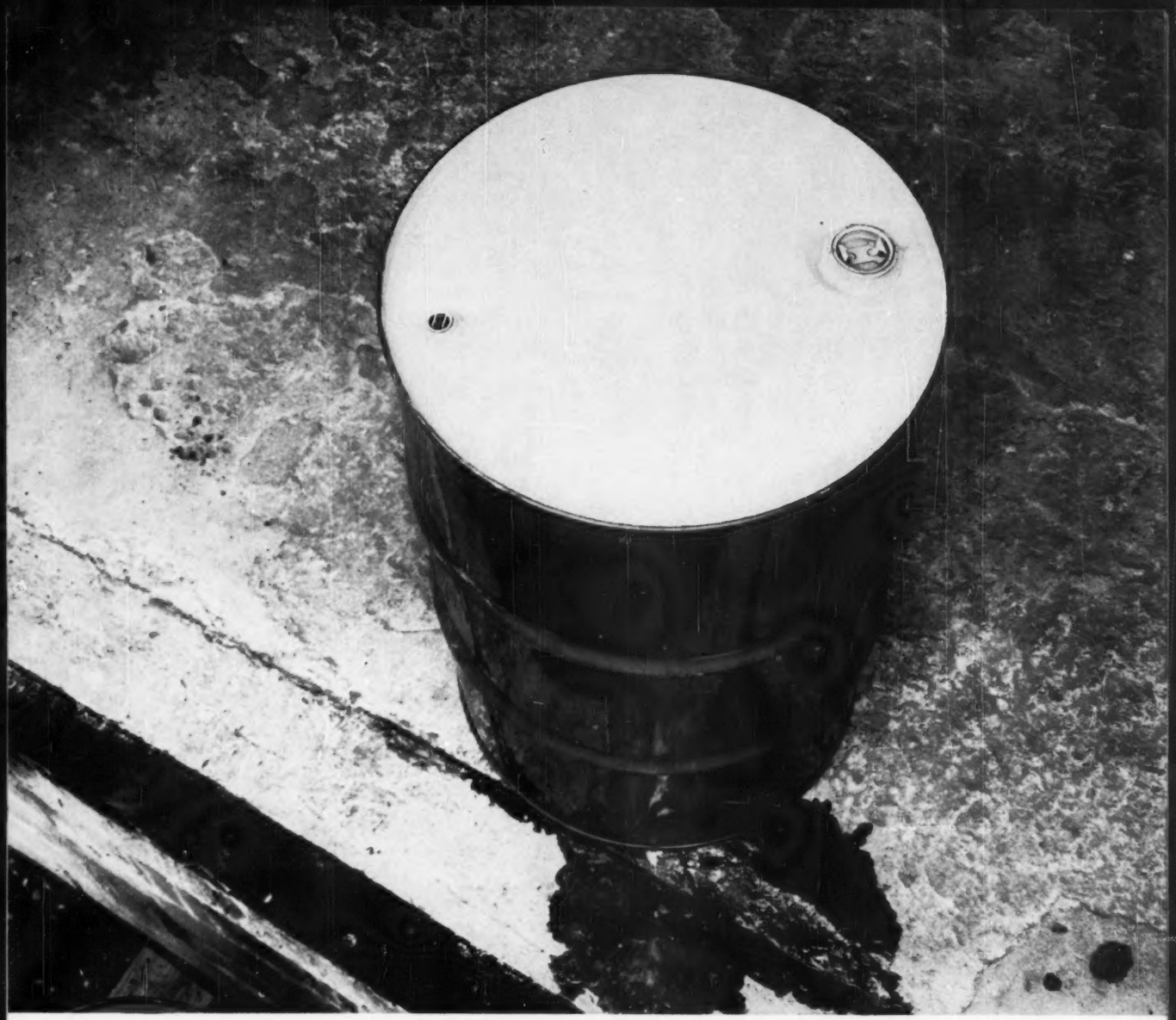
'Atomized' Metals: New metal powders made by "atomization" are offered by Federal-Mogul-Bower Bearings, Inc. They include stainless steel, commercially pure iron, silver, copper, aluminum-copper-nickel alloys, and cobalt alloys. They're for fuel cells, thermonuclear devices, semiconductors, etc., according to Federal-Mogul Division Research and Development (P.O. Box 1048, Ann Arbor, Mich.).

•

Drug Entries: Benzphetamine (Didrex) is a new appetite suppressing drug developed by The Upjohn Co. Kalamazoo, Mich.). It is now under clinical study.

Racobalamin-57 is a new radiopharmaceutical said to make possible a safer and more efficient use of the Schilling test for diagnosing pernicious anemia. It is supplied as a solution or capsule form of vitamin B_{12} with a cobalt-57 radioactive label. Source: Abbott Laboratories (North Chicago).

Crystalline glucagon, a hormone of the pancreas, is now offered by Eli Lilly & Co. (Indianapolis, Ind.) for treating hypoglycemic shock.



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It could be. Your finest products are no better than their containers if leakage or pollution occurs in shipment. With drums from Southern States Containers the odds are against these problems because manufacturing standards are kept at the top. You get uniform quality containers made to keep their contents safe from plant to customer. You also get on-time deliveries, a choice of any lining you need . . . even special ones can be developed for your use . . . and a silk-screen printing service to put your name and message right on your drums.

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DIVISION OF REYNOLDS ALUMINUM SUPPLY COMPANY

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Market Newsletter

CHEMICAL WEEK
December 17, 1960

The phthalic anhydride price picture for '61 is coming into clearer focus this week. Previously uncommitted producer American Cyanamid is reported to be going ahead with a price increase of 1¢/lb., effective Jan. 1, '61. Other producers, Monsanto and Koppers, had not made definite decisions at press time, but indications are they will also go up. This new schedule puts tabs in line with those recently adopted by Allied *(CW Market Newsletter, Dec. 3)*. Starting Jan. 1, contract tabs will be 20¢/lb., c.l. lots (19½¢/lb. in tanks).

While the industry has been reluctant to boost tabs, particularly in the face of an overcapacity situation during '61, the pressures of higher raw-material and operating costs have been strong. During the past two years all producers have gone to extremes to maintain a steady flow of phthalic to their customers, at the same time maintaining the 18½¢/lb. tabs. This despite spot prices that have been double the posted prices.

Behind the move: confirmation by napthalene producers that naphthalene prices will move higher. Koppers reports it will hike naphthalene tabs 1¢/lb., effective Jan. 15. This will put its tabs at 7¢/lb. for 78 degree material. U. S. Steel will up its quotes—but only ¼¢/lb.—to 6.25¢/-lb., effective Jan. 7.

•

Another step in expanding its phosphate flotation pilot plant has been completed by Smith-Douglass Co. at its Tenoroc mine, east of Lakeland, Fla. Capacity of the pilot operation, which uses the new Hollingsworth-Sapp phosphate rock flotation system (*CW, Sept. 24, p. 75*), will be about double its previous input rate of 50 tons/hour of phosphate rock.

According to Smith-Douglass, the pilot plant was originally built with commercial-size equipment. Therefore, the final step in the expansion program, which the company indicates it will carry out, will be a complete changeover to the new process.

•

Parathion and methyl parathion capacity has been increased 50% at Monsanto's Anniston, Ala., plant, upping output potential to 18 million lbs./year. J. Paul Ekberg, marketing director for Monsanto's Agricultural Chemicals Division, says the market for parathion and methyl parathion insecticides has increased more than 50% in the past two years.

•

Demand for tall oil fatty acids (0-6% rosin) will be up 10% in '60, according to D. R. Eagleson, assistant sales manager at Emery Industries, Inc. Speaking to the Northeast Section of the American Oil Chemists' Society in New York last week, Eagleson estimated that demand for tall oil fatty acids is 165 million lbs. this year, 15 million lbs. higher than in '59. He predicted a 230-million-lbs./year demand by '65.

Market Newsletter

(Continued)

Economically available crude tall oil outside the U.S. amounts to about 100,000 tons/year, C. W. Eurenius, assistant general manager of Hercules' Paper Makers Chemical Dept., told the group. This would yield about 60 million lbs./year of rosin and 50 million lbs./year of fatty acids. Some of the sources: Canada with a crude tall oil capacity of 10,000 tons/year; Sweden, about 40,000 tons/year; Finland, about 26,000 tons/-year, and New Zealand, about 1,500 tons/year.

•

Czechoslovakia's consumption of plastics will grow rapidly during the next five years, according to the Czech Ministry of Machine Construction. While many products will be produced domestically, imports are expected to grow over the next five years. Here's how plastic demand shapes up:

Czech Domestic Plastics Requirements (tons)

	'61	'62	'63	'64	'65
Phenol plastics	6,200	7,000	7,400	7,700	8,000
Amino plastics	150	220	270	350	430
Polystyrene	800	1,600	2,400	2,900	3,200
Polyethylene	300	850	1,500	2,800	5,200
Polyamides	550	720	900	900	900
Laminated polyester	1,600	1,900	2,400	3,400	3,400

Two plants make up the center of the Czech plastic industry. Thermosetting materials are turned out by the Press Works for New Materials, of Vrbna pd Pradedem, while thermoplastics are produced at the Igla factory of Plzen, and in Horsovsky-Tyn. Several other plants will be in operation before '65, including a polypropylene unit slated for operation by '64.

Several products will have to be imported, according to the report. This includes polystyrene, low and high pressure polyethylene and polytetrafluorethylene (Teflon).

•

Great Britain now has a home source of sodium chlorite. La Porte Chemical Ltd. has brought the United Kingdom's first unit onstream at Luton, Bedfordshire, England. Although size of the installation was not disclosed, observers report the operation is a small one. In fact La Porte readily admits the new unit cannot supply the country's sodium chlorite needs (England relies on import from Europe). But a company spokesman stressed that the Luton operation represents only the beginning, and near-future expansions are already planned. La Porte's ultimate goal: to win a major share of the British sodium chlorite market. Chief outlets in England for the material: bleaching applications and water purification.

SELECTED PRICE CHANGES—WEEK ENDING DECEMBER 12, 1960

UP	Changes	New Price
Carnuba wax, chalky, bgs.	$0.01	$0.74
Ethyl vanillin oil, dms.	1.10	6.75
Peanut oil, crude, tanks	0.00125	0.12625

WHEN YOU SEPARATE THE WOOD FROM THE TREES

there's a unique chemical here ... NEWPORT PINE OIL

Maybe you think of Pine Oil today as a Detergent or Disinfectant. Because of its wide use in these fields, your conclusion is factual, *but has this overshadowed the fact that Pine Oil is a much more versatile chemical?*

Look at its general physical and chemical properties here and you'll discover – we hope to your surprise – why NEWPORT Pine Oils are also used as: *Mining Frothing Agents, Textile Wetting Agents, Pigment Grinding Aids, Gelatin Retarders* and *Flow Viscosity Improvers.*

Its uses are not limited to one field, but include soaps and cleaners, paints and varnishes, cutting oils, metal chrome polishes, essential oils, ore flotation, pharmaceuticals and leather processing.

Pine Oil, obtained from wood stumps, is completely oil soluble. On emulsification, it is also completely water miscible. It is outstanding **in reducing surface tension** and is an excellent solvent. It is non-toxic under normal conditions and, last but not least, don't forget its fragrant quality where odor masking is necessary!

GENERAL PHYSICAL AND CHEMICAL DATA OF TYPICAL NEWPORT PINE OIL

	Weight Per Gallon @ 15.5° C. (lbs.)	Specific Gravity @ 15.5° C./15.5° C.	Refractive Index @ 20° C.	Engler Distillation °C. 5%	50%	95%	Flash Point °F. (open cup)	Kauri Butanol Value*	Polymerization Residue
G.N.S. No. 5	7.76	0.932	1.482	200	212	220	167	Inf.	0.5%

*Basis: Toluene = 105

NEWPORT INDUSTRIES DIVISION
HEYDEN NEWPORT CHEMICAL CORPORATION 342 Madison Avenue, New York 17, New York

Mail this coupon today for free, detailed information . . .

Gentlemen: Please send me Booklet No. 4 detailing information on Newport Pine Oils.

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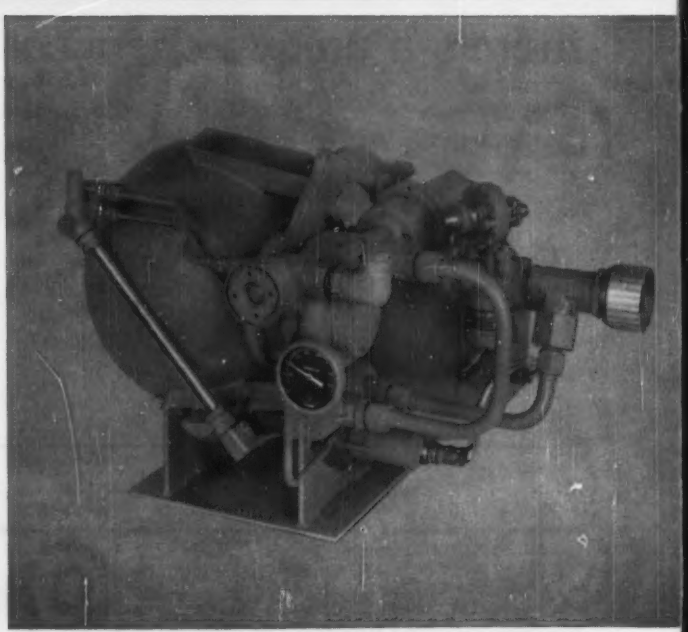
FLUOROCHEMICALS FAMILY *sets new specs for today's materials and processes*

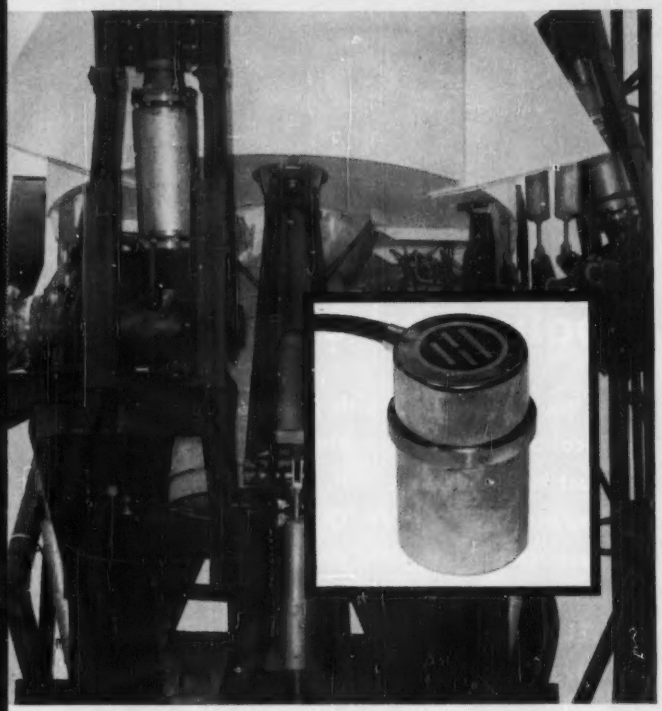
3M specialty chemicals implement better elastomer and rubber processing, new stability in plastics, high corrosion and temperature resistance for many materials

For the increasingly complex jobs facing today's chemical processor, a new and talented family—3M Fluorochemicals—lends a powerful hand. This new *class* of chemicals offers properties that are unduplicated by any other materials to help the processor develop techniques and products that serve well beyond conventionally accepted limits.

In today's chemistry of textiles, paper, packaging, leather, rubber, plastics, metals and structural materials . . . 3M Fluorochemicals add new chemical, thermal and dimensional stability—add flexibility, longevity, strength and functional improvements to many products. And 3M research is still expanding the boundaries of this new chemical frontier. Here are examples of 3M specialty chemicals at work today . . .

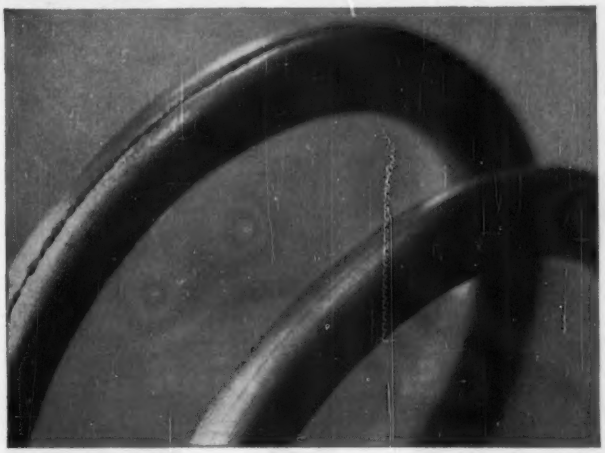


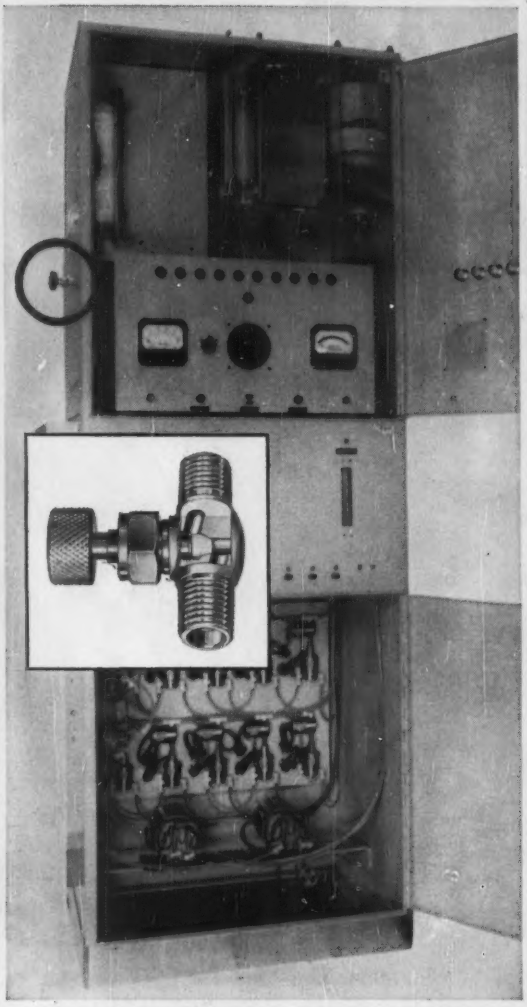
3M BRAND DIELECTRIC COOLANT FC-75 keeps jet bomber's countermeasures system cool. The high heat transfer efficiency of 3M Inert Fluids has proved a big help for designers in miniaturizing electronics gear. These fluids—FC-75 and FC-43—provide high dielectric strength, low solubility, great thermal stability and low pour points. They are highly dense, immiscible and non-corrosive. What can 3M fluids cool off for you?



KEL-F® BRAND OILS are used in guidance gyros to minimize drag and friction on gimbal bearings, since the fluid displaced is the same density as the floating gimbal. Also, the fluid acts as a damping mechanism to cushion against vibration and missile acceleration shock. The "molecular control" possible with KEL-F Oils facilitates careful blending to meet a great range of viscosity and density requirements. Also available as wax or grease. How can they serve you?

NEW FLUOREL® BRAND ELASTOMER 2141, for fluorinated rubber processors, affords an unexcelled Mooney scorch rating that permits faster, more economical cures. Note how Fluorel O-ring, right, is free from defects of other elastomer ring. Fluorel safely permits repeat processing, solves problems involving corrosive materials—withstands 400° F. for continuous service, 600° F. for shorter periods. What can this hard-working elastomer do for you?





KEL-F® BRAND PLASTIC is used in valves handling corrosive gases or liquids. Chemically inert valve tips of this product permit smooth flow of such corrosive substances as ammonia, hydrogen sulfide, hydrocarbon streams, nitrous fumes, hydrogen bromide and ethyl chloride. Valves of this type give positive shut-off, for example, in a series of gas analyzers which monitor gaseous fume leakage in refrigeration, metal plating and treating, petroleum refining and other chemical and industrial plants. How can KEL-F Plastic, unfazed by a hundred chemicals, be of greatest value to you?

Other members of the 3M family of specialty chemicals

CARDOLITE® Brand Resin Flexibilizer for potting and encapsulation • 3M Brand Paint Concentrate for high-strength, non-pigmented primers • CARDOLITE® Brand Friction Components for brake linings, clutch facings, other friction surfaces. For technical data and assistance on any of these 3M products, write 3M Chemical Division, Dept. KAK-120, St. Paul 6, Minn.

"KEL-F", "FLUOREL" and "CARDOLITE" are reg. TM's of 3M Co.

CHEMICAL DIVISION

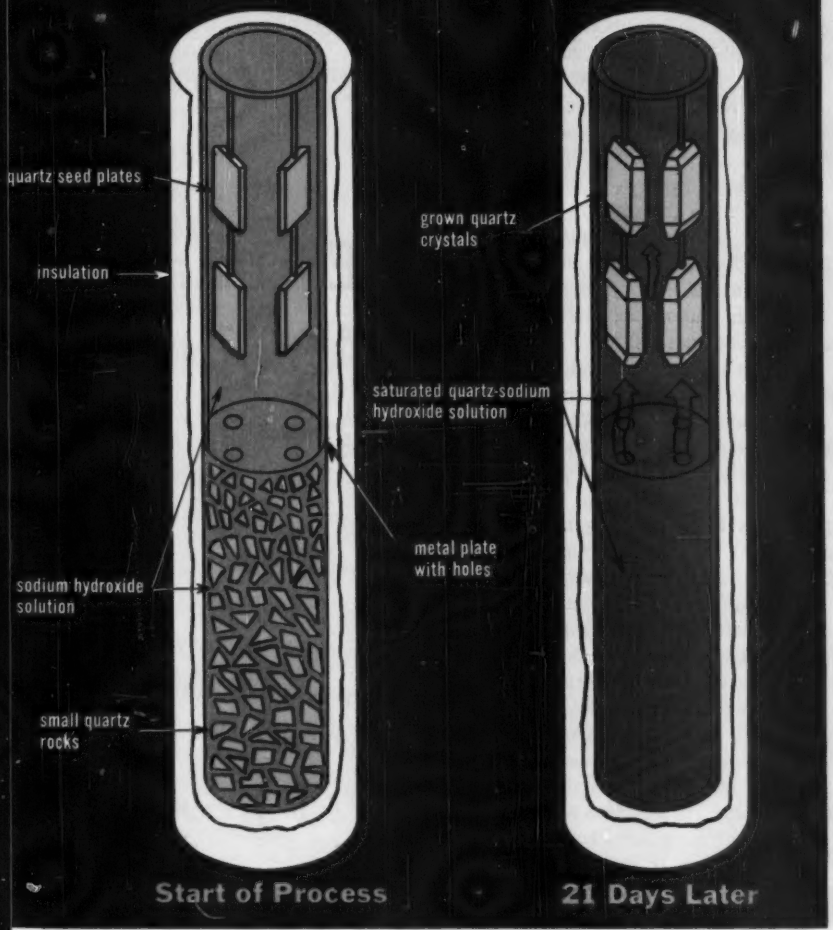
MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY


Dust *isn't* a must with polyvinyl alcohol
If your experience with polyvinyl alcohol resins has convinced you that dust is a necessary evil, try Shawinigan's GELVATOL resins. Because of controlled particle size distribution and absence of fines, GELVATOL resins do not dust. Related advantages of faster dispersibility and less lumping add up to shorter dissolving cycles. Write for more information on these and other money saving, quality features of GELVATOL resins.
GELVATOL® polyvinyl alcohol by
SHAWINIGAN RESINS
Springfield, Massachusetts

Diffusion is key to new quartz-growing process



Quartz: New Cash Crop

Mass production of electronic-grade quartz crystals began last week as Western Electric Co. put its new processing scheme (above) to work at Merrimack Valley, Mass. The $1-million plant there will "grow" up to 14,000 lbs. of quartz each year, about 5% of annual U.S. consumption. The process know-how is available for licensing and the product reportedly is about five times less costly than natural quartz.

Upshot: quartz may find its way beyond communication equipment and optical uses into wave filters and other radio and television components.

Although quartz is outranked only by water as the most common material in the earth, 99% of the grapefruit-size crystals needed for electronic purposes are found in Brazil. Vital for accurate frequency control, quartz was so important during World War II that the U.S. imported an average of 2.5 million lbs./year—about five times the current figure—all from Brazil, which is still the sole source.

The new process should reduce American firms' reliance on Brazil. Walnut-size quartz crystals, raw material for the process, can be obtained in North America if necessary, or for only 40-50¢/lb. in Brazil. Large natural crystals, the size needed for many electronic purposes, cost as much as $20-30/lb. Growing large crystals from walnut-size crystals costs only about $15/lb.

Inside the Process: The basic scheme of the new process has been known for some time. In 1958 Sawyer Research Laboratories (Eastlake, O.) reportedly sold 380 lbs. of quartz crystal made by this technique. But equipment used and operating conditions for volume production — the Western Electric plant has twenty 700-lbs./year autoclaves — was only recently confirmed.

The synthesis takes place in a vertical chromium-molybdenum steel autoclave about 10 ft. long and 6 in. in inside diameter. Surrounding the autoclave are heaters and several inches of sheet marinite, an asbestos insulating material. Inside, a metal plate with holes in 4% of its surface area divides the system into two sections (*see drawing*).

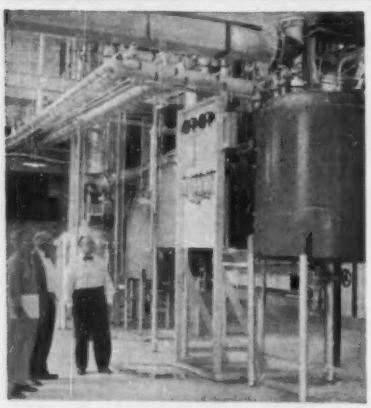
In the lower nutrient zone, small quartz crystals are dissolved in a sodium hydroxide solution at 700 F and under 20,000 psi.

Saturated quartz solution that is formed diffuses upward through the holes in the metal plate into the growing zone. Here the temperature is reduced 50 degrees, supersaturating the solution. "Seed" plates, present in this growing zone, enable the quartz to crystallize out of solution.

These plates, slightly longer and somewhat thicker than playing cards, are made of synthetic quartz or, for special purposes, of natural quartz. The plates are arranged in groups of four, one quartet above the other. The quartz leaving the solution meshes into the crystal structure of these seed plates, forming a clear, flawless crystal.

All in all, a batch of crystals takes three-four weeks to reach the desired size—about equal to a man's two fists. But Western Electric can vary size by changing temperature, pressure, or —and this is most likely—growth time.

Advantages: Besides control of crystal size, the producer of synthetic quartz has two additional advantages over the purchaser of natural quartz: control over the long dimension of the crystal, and control over its uniformity. The crystal structure runs along three axes and the final product is cut parallel to one axis, ideally the longest. Synthetic quartz users are sure of this axis—natural quartz users take pot-luck. And synthetic quartz does not



contain foreign bodies or twinning—flaws in natural quartz that must be cut out during processing.

These advantages of synthetic quartz can be capitalized upon only with commercial-size equipment. Large autoclaves have been built for high-temperature or high-pressure demands. But the synthetic quartz process requires a vessel to meet both these demands simultaneously—and cope with corrosion from the sodium hydroxide solution. A chromium-molybdenum steel was found to do the job.

Problems concerning the seal at the top of the autoclave, the insertion of thermocouples, uniform growth of crystals at the top and bottom of the system, and control of temperature, pressure and solution concentration—all these had to be empirically solved to complete a commerical process.

Western Electric's yield from the process is 6-7.5 lbs. of quartz from every 100 lbs. of raw material vs. 2.5-3-lbs. yields from natural quartz.

Western Electric will not sell synthetic quartz outside its own affiliates; producers licensing the process will not be competing with Western Electric.

Synthetic quartz still faces a hurdle: product acceptance. Quartz users will have to be shown that synthetic quartz is just as good as the natural mineral. But the problem will not be very difficult, for in some ways the synthetic is superior to the natural product. Consequently it's only a matter of time before synthetic quartz will be available on the open market.

Beryllium Recovery

A continuous process to recover beryllium metal from beryllium chloride, a product of ore extraction, has been developed in Hungary.

Process key: a mercury amalgam of a eutectic mixture comprising beryllium chloride and sodium chloride, along with magnesium as a reducing agent. In the process, the eutectic mixture is added to the magnesium and mercury, then heated to about 900 F and fed into a glass-lined electrolytic cell, where the amalgam forms the cathode and a carbon electrode forms the anode. The electrolysis provides energy to reduce the beryllium to metal as the liberated chlorine reacts with the magnesium. The beryllium is then separated by vacuum distillation at about 1700 F.

"4,500 gallons!...on Labor Day weekend?"

"The customer had reached me at home on the Labor Day weekend with a request for immediate delivery of 4,500 gallons of 2-ethylhexyl alcohol," said one of our New England representatives.

"I almost knew before asking that he was not going to define *immediate* as Tuesday or Wednesday. And he didn't disappoint me.

"'If a truck drove in right now, it would be an hour late,' he said. Then he went on about a very special and unexpected plasticizer order and how he was 'way short on the necessary 2-ethylhexyl alcohol and normally his raw material inventories were adequate and if he could get delivery right away he might be able to keep his process running, etc. So I promised to see what I could do.

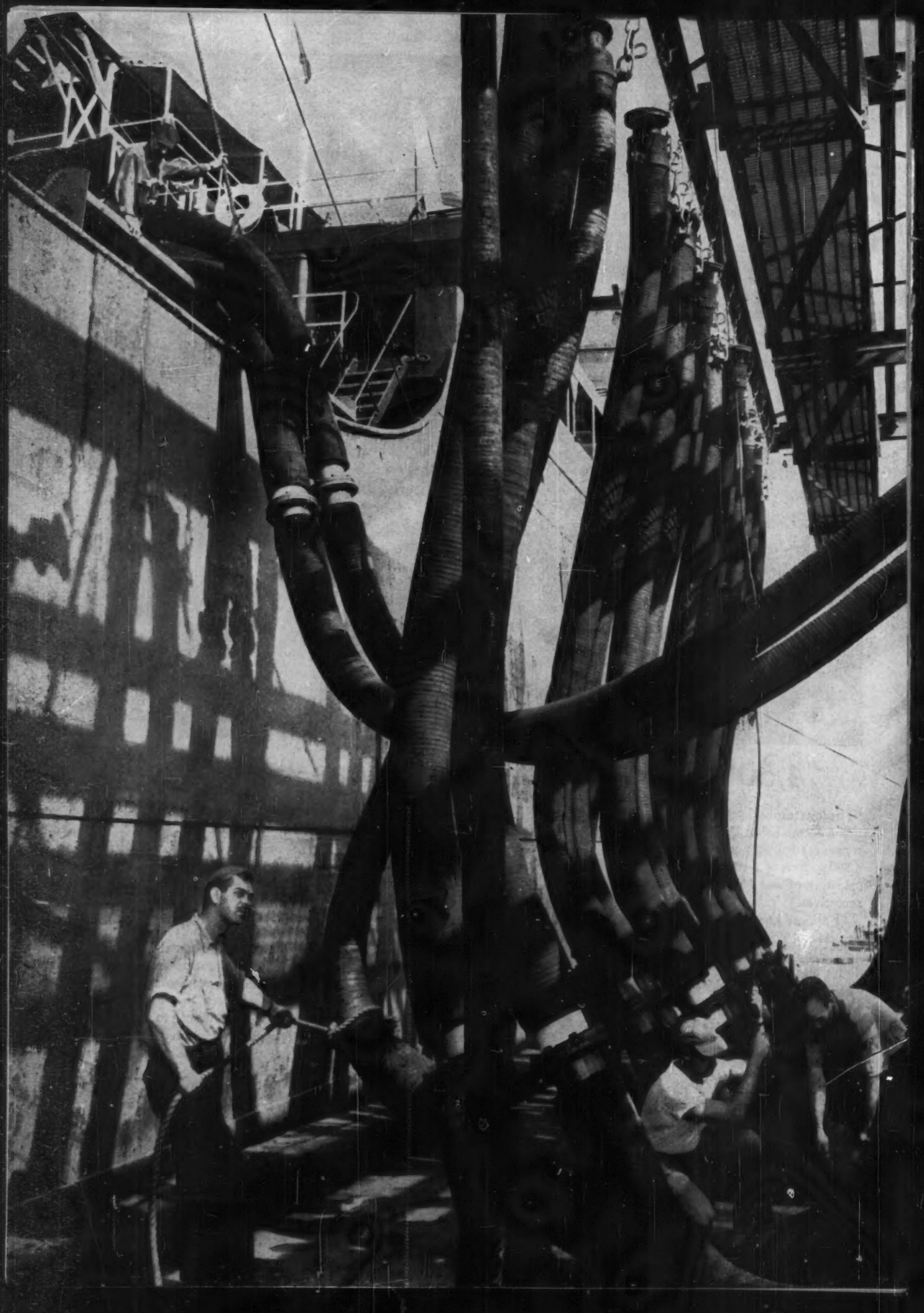
"Luckily, I was able to catch our warehouse manager at home and after checking around he seemed to think he could get up a loading crew. I called the customer back to ease his mind a little... that just as soon as we could locate an available tank truck we'd be in business. That's when he told me about his faith in our service—he had already made arrangements for the tank truck.

"Within two hours we loaded and delivered. The customer confided later in the week that it was on time after all, and enabled him to meet his scheduled delivery date."

Generally, we handle orders on a more scheduled, normal-business-hours, few-days'-notice basis. But if ever you feel the need to arrange for your own tank truck, then call us to fill it up—we'll do all we can to meet your requirements, even on Labor Day weekend.

Eastman CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE, Subsidiary of Eastman Kodak Company

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, North Carolina; Houston; Kansas City, Missouri; New York City; Philadelphia; St. Louis.
West Coast: Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.



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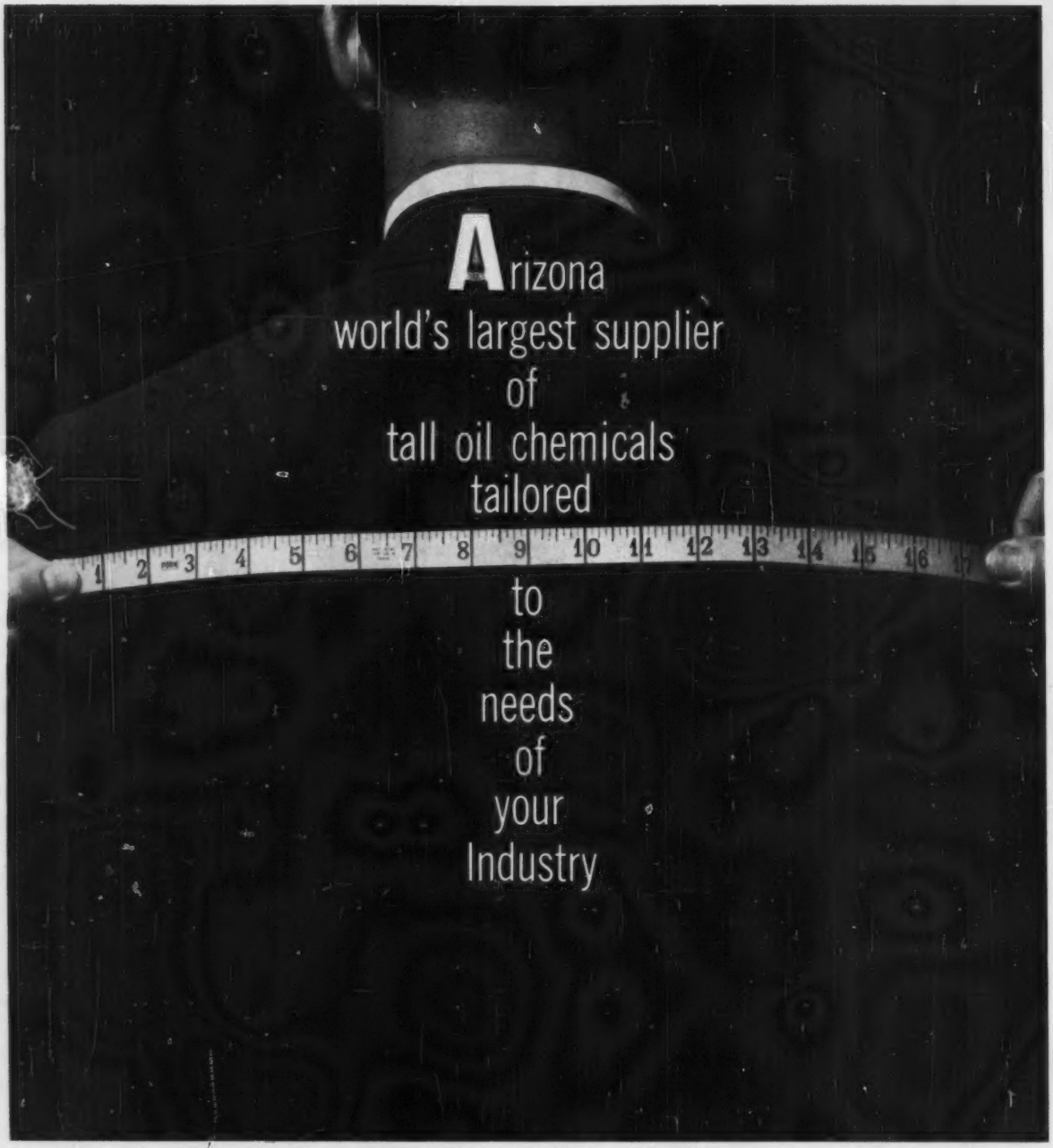

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New Status for the 'Stars'

What can the chemical process industries do with star salesmen who turn down promotions into management? Or with men who are top sales producers but not supervisors? Recent sales staff promotions by B. F. Goodrich Chemical Co. point up one solution: advanced status within the active selling organizations, coupled with more pay.

Goodrich recently named two more field salesmen to its highest selling rank —its marketing representative posts. These positions, says Goodrich, provide the deserved recognition and monetary reward for outstanding salesmen who prefer to stay in the field.

Acceptance of this general approach by sales management is shown in the creation of similar positions by other chemical sales organizations. Dow, for example, has a special rank for its top field-sales staffers, calls them account managers. Allied's Solvay Division calls them field supervisors, assigns to them the job of training field salesmen. Senior salesmen and assistant sales managers are the top sales ranks in a couple of other chemical companies.

Whatever they may be called, these titles reflect in part the chemical processing companies' attempts to set apart and reward their best salesmen who don't want, or aren't suited for, management jobs. These moves are similar to the promotion of the researcher to the equivalent of management rank so that he can continue activity in lab pursuits.

Usually a salary raise comes with the change—often a 10-15% increase. Another common practice is the limitation of these groups to a select few —5-10% of the field force.

Responsibilities accompanying the new positions vary. All approaches, however, keep the salesmen in contact with their field accounts. The Goodrich area marketing representatives are among the few that have the additional job of sales office management.

Beyond the Title: "We're not simply giving the men a title," reports Solvay Sales Director Verne Aubel. That company's field supervisors will take on more key accounts, as well as train salesmen. This is one of the ways that a company can get bonus use from salesmen's experience, Aubel adds.

All these new positions, incidentally, are aimed at keeping the salesmen eager to sell. These ideas are not like some older plans, in which senior men get a new title (e.g., account salesmen) and reduced responsibilities—all part of preparation for retirement. One company discarded such a plan, instead put emphasis on finding a better incentive program to keep the senior men active in sales work.

Part of the value of the promotion in title: it boosts the salesmen in the eyes of their customers. Earlier this year Dow appointed 10 salesmen to its new rank of account manager. At the same time, says Dow's sales department manager, James Day, the men's customers were informed of the promotion. This account manager title is now used officially on letters, business cards and publicity releases.

Monsanto is one of the firms that tries to give its top salesmen special treatment without setting up a title. But as they advance, these high rankers are consulted by the home office on management problems, called in with sales management staffers on selling-program planning. One object is to reduce the distinctions between the experienced field salesman and sales manager.

Koppers is cautious about formal ranks for its top salesmen. Some of its senior salesmen train new men, but they have no special titles or salary range. "We are still looking for a better plan," reports Chemical Division Vice-President John Poole.

Indecision: What if a man later questions his decision not to enter sales management? May he change his mind? In chemical companies, the answers vary but most allow a man to alter his decision.

Monsanto's Organic Chemicals Division has a summer program to help its men avoid career choice mistakes (*CW, Aug. 1, '59, p. 38*). It allows veteran salesmen to take over the district manager's job for three weeks. They can then evaluate their own performance and settle any indecision about wanting the position—and perhaps avoid unhappy second thoughts about their chosen career courses.

New titles point up a growing recognition of nonmanagement careers in selling.

Dow's Day answers the question even more directly: being an account manager does not prevent the man from later going into management. None of the specially created positions sidetrack potential supervisory careers. The only barrier to a shift into management would be age.

Abbott Laboratories minimizes the age problem as having an effect on a change of mind. In its organization, it says a district manager must have "physical stamina," do lots of traveling. The older salesman is not faced with any other requirements, Abbott explains. There are other company and organizational honors he might receive.

The question all have to face: When does a field representative become a "senior" salesman? Generally, if they are to be made at all, the first steps into management are made before a man reaches his late 30s or mid-40s. If the man sticks strictly with sales, successfully, he's due for the "senior salesman" status.

At this point, in the past, the incentive of future promotions hasn't been clear. Although more money is important, the idea that perhaps less productive salesmen are promoted to "management" over the senior men's heads can create a morale problem. Here the new classifications help smooth things in two ways. The salesman may continue his advancement in the company. Also, the way is cleared for younger men to work their way into management.

However, nonmanagement promotions for career salesmen are by no means limited to those beyond their '40s. The main qualifications are a specified minimum term of service and superior performance. Often the better salesmen earn more money than their district managers. This has long been part of the incentive to keep men satisfied in sales. Those entering management are often aware they must wait for better salaries.

The establishment of two parallel plans for advancement seems likely to benefit both company and salesmen. Especially in the face of heavier competition, the more top sellers active in the field, the more the company can gain. And in turn, the salesman can feel it's worthwhile in terms of money and prestige to keep his eye on simply selling the product.

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British Drug Pinch

British drug producers supplying Britain's socialized medical program face some tough profit-trimming if new rules drawn up by the Ministry of Health are put into effect.

The scheme, which will probably be unveiled in the House of Commons this week, aims at paring the National Health Service's drug bill, which runs to more than $150 million/year—one tenth of the total government expenditure for socialized medicine.

There is widespread criticism in Britain that drug prices and profits are "excessive" — particularly those of the subsidiaries of U.S. companies. A recent study by the Board of Trade calculated that the average profit of U.S. subsidiaries in the U.K. is 70%, while British-owned firms make 20%, and Swiss subsidiaries clear 13%.

The new rules would take the form of a voluntary agreement negotiated between the Ministry of Health and the Assn. of the British Pharmaceutical Industry. It's primarily designed to "plug two expensive loopholes" in the '57 agreement, which expires in a few weeks, by:

(1) Insisting on a new, tighter definition of what is a "new drug."

(2) Untying prices paid by the Health Service from the export prices of drugs.

Drugs on the market less than three years are not price-controlled. The first measure is aimed at producers that allegedly take advantage of this by adding meaningless ingredients to a three-year-old drug and representing it as "new" and therefore entitled to three more years of price freedom.

The second action reflects the government's discontent with the present pricing arrangement, under which the Health Service pays the average selling price of a drug if more than 20% of its total sales are in exports. The Ministry of Health feels that as a guaranteed buyer of large quantities, the Health Service should pay only the lowest export price, or even less.

The "outrageous" sums spent by British drug producers on advertising and publicity may also be in for new controls, as part of the general attack on prices. The Ministry has sought the industry's cooperation in gathering information on advertising costs and how they relate to drug prices.

Chemical Week

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